

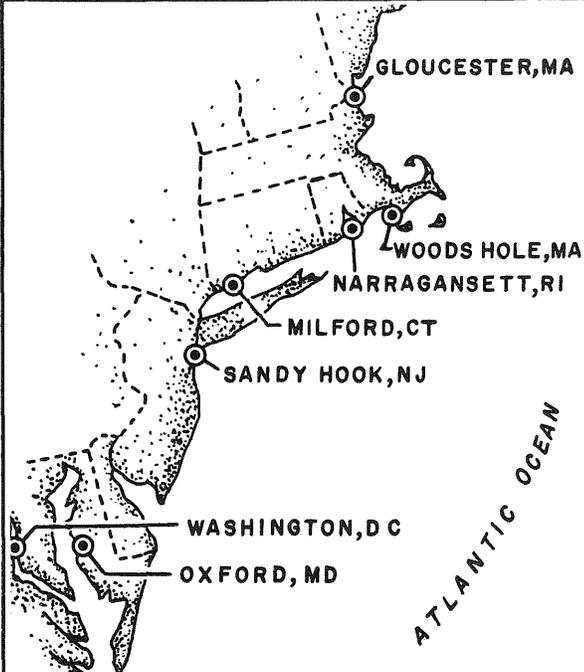
J. Brownlow

NEFC

Northeast Fisheries Center

NEWS

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US DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL MARINE FISHERIES SERVICE



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SUBMISSIONS TO THE "NEFC NEWS" ARE PREPARED BY THE AFOREMENTIONED RESEARCH ADMINISTRATORS, AND COMPILED AND EDITED BY JON A. GIBSON, TECHNICAL WRITER-EDITOR, NEFC.

CENTER DIRECTORATE

Fisheries Utilization Office

Joseph Carver attended a US Department of Commerce/US Department of Agriculture meeting in which a decision was reached which places the responsibility of preparing specifications for seafoods in NMFS. Joe's presence was necessary because the Gloucester Laboratory has the bulk of the NMFS responsibility for preparing standards and specifications.

Special Scientific and Technical Projects Office

The Falmouth (MA) Conservation Commission signed off on the letter of conditions for the new power project at the Woods Hole Laboratory, giving the "go ahead" for the state permit.

Admiral Houlder, Director of the National Ocean Survey's (NOS) Atlantic Marine Center, visited on the 24th and 25th and received a complete tour of the NEFC facilities at Woods Hole and Otis Air Force Base.

Pat Twohig and Ronald Smolowitz completed a manuscript, "The Application of an Underwater Color Video System to Fishing Gear Research," to be presented at the Benthos, Inc., symposium on "The Scientific and Engineering Applications of Underwater Photography."

An abstract, "Power System Requirements of an Electro-Hydraulic Clam Dredge," by Jim Crossen and Ronald Smolowitz was selected for the Marine Technology 80 Conference's session on sea-floor engineering.

RESOURCE ASSESSMENT DIVISION

Resource Surveys Investigation

The Investigation began an intense period of preparation for upcoming cruises. We will launch seven major cruises comprised of over 20 cruise legs between March and November; all members of the Investigation are involved. Planned in addition to the routine spring, summer, and autumn bottom trawl cruises are cruises aimed at deep-sea red crab, sea scallop, and surf clam-ocean quahog resources, as well as gear testing involving trawls, scallop dredges, and the clam dredge.

The first part of the spring bottom trawl cruise aboard the NOAA R/V Delaware II was conducted during 16-28 March. Linda Despres was chief scientist and Don Flescher, Dennis Hansford, and Eva Montiero also participated. The second part began on 29 March with Henry Jensen as chief scientist and Liz Bevacqua also participating.

Several members of the Investigation (Henry Jensen, Eva Montiero, Linda Despres, Don Flescher, and Pat Twohig) worked on papers or posters to be presented at the upcoming Second Annual NEFC Research Conference in April.

Tom Azarovitz, Liz Bevacqua, and Chuck Byrne continued working on the US Bureau of Land Management (BLM) final report.

Jim Crossen, accompanied by Ambrose Jearld and Jack Suomala (C.S. Draper Laboratory in Cambridge, MA), met with the hydroacoustic group at the Bedford Institute of Oceanography in Halifax, NS, to plan future joint hydroacoustic cruises. Jim also participated in an underwater cable/connector workshop at the University of Rhode Island Graduate School of Oceanography at Kingston, RI; the workshop was sponsored by the Marine Technology Society.

Fishery Biology Investigation

Finfish

Cathy Rearden completed impressing 1979 Sandy Hook Laboratory recreational bluefish scale samples and began aging them. Brenda Fields completed aging and summarizing 1977 and 1978 summer flounder research survey samples. Louise Dery assisted in the above projects and aged 1979 commercial and fall research survey Atlantic mackerel samples. She also attended a supervisor's training course.

Ambrose Jearld attended meetings in Dartmouth, NS, at the Bedford Institute of Oceanography and in Halifax, NS, at Dalhousie University, to meet with Canadian and New Zealand scientists regarding a joint hydroacoustics and fish assessment project.

Age and Growth

Vi Gifford and Kris Andrade completed examining 926 redfish otolith sections for the age validation study. Vi worked up summary tables of the results and is presently coding the data for keypunching.

Judy Penttila spent 2 days working with Fran Pearce from the Maine Department of Marine Resources in West Boothbay Harbor, ME. Fran was shown our current procedures for sectioning otoliths and impressing scales, and then worked with Judy aging Atlantic cod, American plaice, and yellowtail flounder in order to gain some basic knowledge of age-reading methods.

Judy also spent time updating summaries of Atlantic cod age-length data for the years 1970-79.

Shellfish

J. Ropes completed examinations of ocean quahog shells for a study of early growth. Measurements of "growth rings" on the right-hand, uncut, external shell surfaces were found to correspond with "growth lines" seen in acetate peels of sectioned shells. The measurements have been shared with S. Murawski and provide valuable data on early growth.

Slides of the gonadal tissues collected with the above shells have also been examined. A preliminary analysis indicated that 27% (36/134) of the clams were in an undifferentiated condition, i.e., immature. These specimens ranged from 18.7 to 46.1 mm in shell length and were from 2 to 8-yr old, averaging 4.9 yr. The youngest male clam seen in the collection was 20-mm long and 3-yr old; the youngest female was 37.5-mm long and 5-yr old. More young males were identified than females, suggestive of protandry, except that no hermaphrodites have been identified for the species and the condition in general would be an anomaly. Clams older than 8 yr were fully mature. The gonads of younger clams that could be sexed were much less well developed and their contribution to the reproductive potential of the species would be minimal.

Maurice Crawford has been learning the method of preparing surf clam chondrophores for age analysis. He has prepared about 160 specimens and completed all available clam shells from Delaware II Cruise No. DE 78-07. The clams Maurice worked on were small individuals. Their fragile shells necessitated using the slow-speed diamond saw in cutting out the chondrophore. This technique has not

been used before, but it worked well. The specimens needed little polishing of the cut edges before gluing them to slides. For these samples, we must yet produce photographic prints and measure growth increments.

Peter DeSouza, with some help from Paul Skinner, finished drying and packaging clam shells from Delaware II Cruise No. 80-01. A total of 1023 surf clams and 1339 ocean quahogs have been stored for future processing. Peter also completed logging of the 1977-79 commercial sea scallop samples.

Loretta O'Brien continued aging 1979 research survey sea scallop samples. Audits for the first set of strata (45-52) have been corrected and sent to Paul Wood.

Aging of 1979 research survey samples for the remaining strata will be done by measuring length to annulus which has not been done in recent years. This should provide additional information for age analysis.

Loretta completed formal training application forms for attending summer school courses in statistics at Iowa State University.

Loretta also made preparations for presenting a paper, "A Unique Method of Aging Surf Clams," at the Second Annual NEFC Research Conference.

Sandy Hook Investigation

Stuart Wilk, working with Brad Brown, completed a manuscript, "A Description of Those Fisheries Which Take Place in the Western North Atlantic Between the U.S.-Canadian Border and North Carolina, Which Presently Have or Potentially Could Have User Group Allocation Conflicts." This paper will be presented at an international symposium on fishery resource allocation in Vichy, France, during 20-24 April 1980.

Wally Morse participated in the 1980 spring bottom trawl survey aboard the Delaware II.

Darryl Christensen and John Clifford finished the final revision to the manuscript, "A Comparison of Daytime and Nighttime Catches of Bluefish (Pomatomus saltatrix)," and resubmitted it to the Transactions of the American Fisheries Society. Work was also continued on the final analysis of the 1975-77 party and charter boat survey data.

Fishery Assessment Investigation

Emma Henderson worked on development of variance estimates for virtual population analysis (VPA), consulted with several members of the Division on mathematical problems, and drafted a manuscript on partial recruitment using a simplified version of Allen's method.

Anne Lange fulfilled data requests by the NMFS International Organizations and Agreements Division relative to US-Canada negotiations, and initiated a squid assessment update. She also prepared and submitted abstracts for two papers on the squid fishery and its management for presentation at the 1980 National Shellfisheries Association meeting in June. Anne has accepted a 4-6 mo temporary position in Washington, DC, as Project Coordinator to the Deputy Assistant Administrator for Fisheries beginning on 21 April.

Steve Murawski continued studies on age, growth rate, abundance, and distribution of ocean quahogs in the Middle Atlantic Bight. Steve also initiated surf clam and ocean quahog assessment updates and summer flounder mortality studies utilizing historical mark-recapture data obtained from the State of New Jersey.

Gordon Waring and Frank Almeida participated in the first leg of the 1980 spring bottom trawl survey from Cape Fear to Chesapeake Bay.

Paul Wood continued sea scallop assessment work and provided information to Mr. Brook Tolerfer (a freelance writer) of Marblehead, MA, relative to Massachusetts groundfish landings. Paul also provided information to the US State Department concerning the US 1979 sea scallop fishery.

Thurston Burns continued his involvement with the New England Fishery Management Council (NEFMC) Lobster Plan Development Team including work on surplus production modeling and yield-per-recruit analysis for inshore and off-shore lobsters. Results will be incorporated into a draft fisheries management plan for lobsters in the US Fishery Conservation Zone (FCZ).

Margaret McBride worked with Brad Brown and Michael Sissenwine on updating the yellowtail flounder assessment.

Ralph Mayo was heavily involved with preparations for the Second Annual NEFC Research Conference in Woods Hole during 1-3 April. Frank Almeida, Thurston Burns, Anne Lange, Ralph Mayo, Margaret McBride, Joan Palmer, Gordon Waring, and Paul Wood prepared contributions for this meeting.

Senior Assessment Scientists

As a result of an amendment to the Anadromous Fish Conservation Act, approximately five million additional dollars are available to support striped bass research during FY80-82. This new effort was stimulated by a perceived emergency resulting from the decline of the striped bass fishery in the Northeast. An action plan for the emergency striped bass study is required by the amendment and this is being prepared by a plan development team. Michael Sissenwine and Stu Wilk currently serve as NMFS representatives on the team. Other participants are from the US Fish and Wildlife Service (FWS) and the US Environmental Protection Agency (USEPA). The plan development team reports to a planning and coordination committee (including William Gordon and Allen Peterson of NMFS). Thus, striped bass research (primarily planning at this time) is receiving significantly more attention than previously.

Brad Brown worked extensively with Margaret McBride and Mike Sissenwine on the 1980 yellowtail flounder assessment and coauthored two Woods Hole Laboratory reference documents on this species. He also substituted for Mike Sissenwine at a meeting of the Striped Bass Planning and Coordination Committee in Philadelphia. Brad provided comments on the scientific adequacy of several studies being considered for funding as part of the emergency striped bass research program. Extensive field study programs from Virginia to New York were discussed; a meeting was scheduled (to be coordinated by Stu Wilk and Mike Sissenwine) to review more critically the details of the proposed program. Brad also attended a meeting of the Executive Board of the American Fisheries Society (AFS) at which further progress was made on development of an NMFS contract for establishment of an assessment committee which would work with NEFC on a trial basis to provide a status of the stocks document for the Northeast. The bylaws of the AFS Marine Fisheries Section were also accepted and it can now be expected that with some additional effort the section will become a reality in autumn of this year. Progress was also made in establishing a fishery management journal which would publish management-related papers.

Vaughn Anthony participated in several meetings of the Transition Committee which is concerned with transfer of statistical reporting activities from the Northeast Regional Office to the NEFC. He also prepared an abstract of a paper titled "The Management and Demise of Georges Bank Herring" for presentation at the September meeting of AFS in Louisville, KY. Vaughn also worked with Maine Department of Marine Resource personnel to obtain offshore sea scallop length and age data.

Fred Serchuk continued analyses of commercial and research vessel survey data to derive new shell-length/meat-weight relationships for sea scallops. He also summarized results of a survey on career development, promotion, and training by the Woods Hole Laboratory Equal Employment Opportunity (EEO) Committee. Other duties included review of an application for Federal assistance on a proposed walleye angler project submitted to the Federal Aid Branch of the Northeast Regional Office, and revision of a sea sampling report and manuscript by Lowell Fritz of the Virginia Institute of Marine Science (VIMS).

Steve Clark continued work on updating haddock and pollock assessment material. A draft review and assessment paper for the Georges Bank and Gulf of Maine haddock stocks incorporating results of the 1979-80 assessments is nearly completed, and a revision of the 1979 pollock assessment document by Clark, Burns, and Essig was completed for in-house review. Steve also coauthored US contributions to the International Council for the Exploration of the Sea's (ICES) Shellfish Committee Administrative Report and Bibliography for 1979 with Michael Castagna (VIMS) and Jack Pearce and Mabel Trafford of the Sandy Hook Laboratory.

Emory Anderson worked extensively on the 1979 US research report to the Northwest Atlantic Fisheries Organization (NAFO), and on a 1980 Atlantic mackerel assessment update. He also reviewed a manuscript submitted to the NAFO Research Bulletin.

Meetings, Talks, Visitors, and Publicity

Anne Lange met with W. Chamberlin of the Atlantic Environmental Group (AEG) during 3-5 March to discuss the relationship of squid catches to Gulf Stream eddies, and during 3-7 March Mike Sissenwine attended a meeting of the ICES Ad Hoc Working Group on Multispecies Assessment Models in Copenhagen, Denmark.

On 6 March, Fred Serchuk and Paul Wood attended the NEFMC Sea Scallop Oversight Committee meeting in Peabody, MA, and Vaughn Anthony, Emory Anderson, and Stuart Wilk attended a meeting of the Mid-Atlantic Fishery Management Council's (MAFMC) Scientific and Statistical (S&S) Committee in Philadelphia.

On 13 March, Mike Sissenwine participated in a joint meeting of the Rhode Island and Massachusetts Marine Advisory Commissions in New Bedford, MA. Brad Brown attended the Eastern North America Regional Meeting of the Biometric Society on 13 and 14 March, where he conferred with Dr. G. B. Patil on joint research activities involving recruitment probability distribution functions.

On 14 March, Joan Palmer presented a paper at the joint meeting of the Biometric Society, the Institute of Mathematical Statistics, and the American Statistical Association in Charleston, SC, titled "Description of Recruitment in 18 Selected Fish Stocks" by R. C. Hennemuth, J. E. Palmer, and B. E. Brown.

On 17 March, Fred Serchuk participated in an EEO Affirmative Action Subcommittee meeting at the Woods Hole Laboratory. Fred and Steve Clark also met with members of the Fishery Oceanography Investigation of the Marine Ecosystems

Division to discuss topics of mutual scientific interest. Steve Murawski met with Drs. Michael Ross, John Finn, and Charles Cole to discuss possible research interactions between NEFC and the Department of Forestry and Wildlife Management at the University of Massachusetts.

On 18 and 19 March, Anne Lange participated in a meeting of the Georges Bank Task Force Monitoring Subcommittee regarding oil lease sites, and Mike Sissenwine participated in a planning meeting for emergency striped bass research in Washington, DC. Fred Serchuk met with a Southeastern Massachusetts University graduate student on 19 March to review deep-sea red crab thesis research, and Emory Anderson met with Roger Coomb, Margaret King, and Chris Francis of the New Zealand Ministry of Fisheries on the same date to review the NEFC bottom trawl survey.

Brad Brown attended a Marine Resources Monitoring, Assessment, and Prediction Program (MARMAP) planning meeting at the SWFC's La Jolla Laboratory during 19-20 March to scope out development of a new MARMAP planning, documentation, and monitoring system.

Mike Sissenwine participated in a meeting of the Northeast Fisheries Management Task Force in Providence, RI, on 20 March.

Brad Brown met with Stu Wilk in Newark, NJ, on 21 March to complete work on a paper for presentation at the Recreational-Commercial Allocation Symposium in Vichy, France.

On 25 and 26 March, Mike Sissenwine attended a meeting of the NEFMC in Peabody, MA, and participated with Stuart Wilk in a planning meeting for emergency striped bass research. On 27 and 28 March, Mike and Stuart Wilk attended the Marine Recreational Fisheries Symposium in Boston, MA.

On 27 March, Fred Serchuk attended a meeting of the Woods Hole Laboratory EEO Committee and met with Taina Honkalehto of Smith College concerning research projects in biogeography and resource economics.

Brad Brown attended a meeting of the Fisheries Task Force of the National Academy of Science's Ocean Policy Committee on 31 March.

Publications

Serchuk, F. M.; Schmitt, C. J.; Floyd, B. Rainbow trout: a population simulation based on individual responses to varying environmental and demographic parameters. *Env. Biol. Fish.* 5(1):15-26;1980. (P)

Reports

Brown, B. E., Sissenwine, M. P.; McBride, M. M. Implications of yellowtail flounder stock assessment information for management strategies. Woods Hole Lab. Ref. Doc. No. 80-21;1980. 12 p.

McBride, M. M., Sissenwine, M. P.; Brown, B. E.; Kerr, L. M. Yellowtail flounder (*Limanda ferruginea*) status of the stocks, March, 1980. Woods Hole Lab. Ref. Doc. No. 80-20;1980. 39 p.

MANNED UNDERSEA RESEARCH AND TECHNOLOGY PROGRAM

Pigeon Hill

Work continues on the 0.25-m² samples disruptively collected from Pigeon Hill on Jeffreys Ledge. These diver-collected specimens will provide a data base for a variety of scientific publications. Assembly has begun on a multi-authored paper tentatively titled "Ecology and Geology of Pigeon Hill-Jeffreys Ledge from Diving Collections and Underwater Photography." This paper will use information collected during 1978 and 1979 to present a species list, species abundance and diversity, behavior observations, interspecific relationships, and species depth variability at Pigeon Hill.

Amphipods, caprellids, algae, and polychaetes have been sorted and weighed. Positive identifications have been made on all amphipod and algal species. Tentative identifications have been made on caprellid and polychaete species. Sponges and bryozoan samples await identification by experts. Dr. Hartman at Yale University has identified some of our difficult sponge specimens.

Ken Pecci and Charles Gross traveled to the University of New Hampshire to confer with Dr. Larry Harris, Jon Witman, and Al Hulbert on progress each group has made on our samples and on information needed for a paper major authored by Dr. Harris on species composition on horizontal versus vertical surfaces at Pigeon Hill.

Analysis of 35-mm slides taken at our study transects for percent cover by species was completed. This information will be compared to the collected specimens and to a random dot analysis to determine the relative effectiveness of the three techniques.

Plans were made for 9 days of diving this July at Pigeon Hill using the NOAA R/V Rorqual out of Gloucester, MA.

University National Oceanographic Laboratory System-Submersible Requirements

Dick Cooper chaired a subcommittee meeting on shallow (shelf and slope) water submersible requirements (government and academia) to define national scientific requirements for research submersibles over the 1980's and 1990's. This meeting was held at the Woods Hole Laboratory. The output of this subcommittee will be added to the requirements for deepwater submersibles to represent the overall national needs for research submersibles.

NOAA-Fisheries Research Scientific Diving Requirements

Cooper chaired a fisheries committee of government and academic scientists to define the research strategies, missions, and goals of NOAA requiring scientific diving, manned and unmanned, through the 1990's. This approach will be used by NOAA management in reviewing NOAA and non-NOAA proposals of undersea research. Other committees treated the areas of: (1) ocean pollution, (2) sea-floor processes and dynamics, and (3) ocean services.

The redefinition of NOAA's role in undersea research is part of a "revitalized effort" to provide more and better support for NOAA's undersea requirements. For example three regional university (Hawaii, Southern California, and North Carolina) program proposals are now in their final stage of review prior to NOAA funding support. Cooper is chairing this final review committee.

Georges Bank Undersea Study

The MURT team personnel prepared a proposal of undersea research to monitor living resources and their habitats in oil and gas drilling areas of Georges Bank. This proposal was reviewed, along with other proposals, for FY80 and has been granted funding for program operations to begin in July 1980. This program represents a cooperative, shallow-water, undersea research effort between MURT, Harbor Branch Foundation (Fort Pierce, FL), and Rutgers University. NOAA's Manned Undersea Science and Technology Office and the Hax and Victoria Dreyfuss Foundation are funding certain portions of the program. A complementary deepwater cruise is scheduled for August in a cooperative effort with the US Geological Survey (USGS) using the DSRV Alvin - R/V Lulu dive system.

American Littoral Society Meeting

Cooper gave a talk to the American Littoral Society at the American Museum of Natural History in New York City, titled, "Direct Observations on the Ecology and Behavior of the Tilefish in New England Submarine Canyons."

Harbor Branch Foundation

Joe Uzmam visited Harbor Branch Foundation in Ft. Pierce, FL, during 8-10 April to develop further plans for cooperative submersible studies on Georges Bank and to test dive the Johnson Sea Link submersible (USL-1). Two dives were made on an Oculina coral reef in 280 ft of water. The USL-1 has no equal among shallow-water submersibles and should prove highly effective on Georges Bank.

Miscellaneous Biological/Ecological Work

Roger Clifford audited all computer print-outs of fish stomach content data originating from 1977-78 cruises by the F/V Barbara L on Jeffreys Ledge. The data should shed light on the potential predators of Atlantic herring eggs around traditional spawning grounds.

For several projects, including Ocean Pulse, Chuck Gross analyzed deepwater colonization panels to determine species composition, diversity, and percent cover; sorted and identified benthic samples; and analyzed benthic photographs to determine species composition and percent cover.

Miscellaneous Diving and Sampling Gear Work

Cliff Newell and Roger Clifford designed and/or installed a surface manifold for the diving bell-HeO₂/air system. They also overhauled SCUBA gear.

Newell installed an oxygen breathing system in the Drager portable two-man recompression chamber.

Tom Meyer continued to work on a manuscript, "Underwater Observations on the Performance and the Environmental Effects of a Hydraulic Clam Dredge in a High Clam Density Area Off South Western Long Island, New York."

Meetings, Talks, Visitors, and Publicity

During 18-20 December, Cliff Newell attended a NOAA Diving Instructor Workshop in Rockville, MD. During 7-11 January, he attended an Operational Diving/Divemaster Class at the NOS's Pacific Marine Center in Seattle, WA, and during 14-18 January, a similar class at the NOS's Atlantic Marine Center (AMC) in Norfolk, VA. During 4-6 February, he also attended the International Diving Symposium in New Orleans, LA.

During 3-15 February, Tom Meyer attended a NOAA Corps Officer Refresher Course at the Marine Academy on Long Island, NY.

During 18-22 February, Cliff Newell attended the Basic Surface Supplied Polluted Water Class at AMC. He also attended, during 28-29 February, the advisory meeting of the University of North Carolina Consortium for Underwater Research in Raleigh, NC.

Roger Clifford spent 23 days aboard the Polish R/V Wieczno as part of a MARMAP survey of Georges Bank and the Gulf of Maine.

MARINE ECOSYSTEMS DIVISION

Ecosystem Dynamics Investigation

Wendell Hahm completed a preliminary analysis of feeding selectivity based on predator/prey size relationships for 17 major demersal species on Georges Bank. Also, feeding periodicity was analyzed for several key species. These data are inputs for the components of the model GEORGE which will simulate feeding interactions. Brian Hayden wrote several more computer programs for summarizing and auditing the food chain data base and Ed and Ann Durbin continued their work on the daily ration model.

Mike Pennington finished a theoretical evaluation of the statistical efficiency of the delta distribution as applied to ichthyoplankton data. He showed that if non-zero values are distributed as log-normal, then the delta distribution estimate of the arithmetic mean will be five times more efficient than a simple arithmetic mean, and also more efficient than a re-transformed mean from log-transformed data (the usual method applied to our survey data). The paper is being prepared for publication in a biometric journal. Mike also worked with Rich Langton and Bill Robinson (Northeastern University) on variability of tubule types in clams, and he continued work on analyses of the haddock fecundity data.

Marv Grosslein, Wendell Hahm, Rich Langton, and Roger Theroux met with benthic ecologists at the Sandy Hook Laboratory to develop an issue paper on benthic research programs for the NEFC, and to consider possible reorganization of benthic studies in the Center.

Wendell Hahm conferred further with Ira Sohn and Frank Hoppenstaedt at New York University's Institute for Economic Analyses on input-output modeling as applicable to GEORGE, and made tentative plans for an informal workshop in Woods Hole in July related to development of an economic analysis subroutine for our model. Wendell also worked on a benthic component model with Drs. S. W. Nixon and C. A. Oviatt at URI which eventually is to be incorporated into GEORGE. Finally, Wendell met with Tom Leschine and Geoffrey Evans of the Woods Hole Oceanographic Institution (WHOI) modeling group, regarding parallel development of analytical and simulation approaches to ecosystem modeling.

Recruitment Processes

Greg Lough, George Bolz, and Mike Pennington have been working on a growth model for larval Atlantic herring based on otolith daily ring increments from laboratory-reared and field-collected larvae. The model will describe growth from hatching to metamorphosis. Various correction factors, such as shrinkage, extrusion, and avoidance, are being evaluated with our present level of knowledge and these factors will be incorporated into an analysis of the entire International Commission for the Northwest Atlantic Fisheries (ICNAF) larval Atlantic herring data base. All 0.333-mm-mesh larval herring data, 1971-76, are being entered into the computer by Ira Palmer (University of District of Columbia co-op student) so that in the next 3-4 wk we should be ready to begin the final estimation of larval herring mortality rates over the time series. George Bolz is preparing a manuscript on total ichthyoplankton abundance and distribution from the ICNAF time series and will give a talk at the Second Annual NEFC Research Conference in Woods Hole during 1-3 April.

Greg Lough and Geoff Laurence visited the Bedford Institute of Oceanography during 3-5 March to talk with Dr. Alex Herman and Dr. Raymond Sheldon about the application of electronic particle sensors for the rapid counting and sizing of planktonic organisms, particularly copepod nauplii which are food for recently hatched fish larvae. Greg Lough, Geoff Laurence, Robert Marak, and Ron Schlitz visited NOAA's Engineering Development Laboratory in Washington, DC, on 18 March to discuss possible development of a plankton-pumping system to meet our specific needs in larval fish process-oriented studies.

Dave Potter continued work on the neustonic ichthyoplankton manuscripts and issued "NEFC Energy Newsletter No. 5" this month. Dave will attend the East Coast Benthic Ecology Meeting on 29 and 30 March at William and Mary College in Williamsburg, VA, and immediately thereafter meet with Professors Herb Austin, Jack Musick, and John Merrimen at VIMS to discuss a master's thesis research proposal regarding the vertical distribution of herring larvae.

Roz Cohen reviewed two seasons of larval Atlantic herring morphological condition factor measurements as part of the larval herring food habits study. Various correction equations from a soon-to-be-published manuscript by Gail Theilacker (SWFC) are being considered for variable shrinkage of body parts due to net damage and preservation shrinkage. Roz has revised and updated all SPSS system files for all larval herring gut-content data, a total of three seasons, and has continued working with Brian Hayden on retrieving zooplankton data listings by station, species, and abundance. Considerable time was spent with Otis Jackson attempting to run data. Roz also reviewed a manuscript for larval Pacific hake feeding by B. Sumida and G. Moser (SWFC) for a California Cooperative Oceanic Fisheries Investigation (CalCOFI) report. Roz attended two Equal Employment Opportunity Program (EEO) meetings on 4 and 27 March, and a Federal Women's Program (FWP) meeting on 29 February. Beatrice Hess and Tom Morris completed processing of the last larval herring gut material to complete the 1976-77 season. Tom completed copying all the master station records and net tow data information onto standard computer keypunching sheets for the West German R/V Anton Dohrn (Cruise No. 78-03) larval herring patch study. He is now developing his skill at zooplankton identification. Hal Merry has hooked up a module to our teletype, installed a data selection switch for the Automatic Data Processing (ADP) Unit, and serviced a radio teletype for H. C. Boyar to use for NOAA R/V Albatross IV communications. Robert Livingstone retired as of 29 February and is now on a

temporary appointment organizing and transferring his files on maturity stages and fecundity to Wally Morse at the Sandy Hook Laboratory, and completing the haddock fecundity paper with Mike Pennington and Wally Morse.

Benthic Dynamics Investigation

Rich Langton attended an ICES Ad Hoc Working Group Meeting on Multispecies Assessment Model Testing in Copenhagen during 3-7 March. He also visited the Danish Institute for Fisheries and Marine Research and the laboratory of Dr. David Grove in Menai Bridge, Wales, United Kingdom. Later in the month he visited the Sandy Hook Laboratory where he, Roger Theroux, Marv Grosslein, Jack Pearce, Robert Reid, Frank Steimle, and Wendell Hahm discussed the future of benthic studies within the NEFC. Rich Langton and Marv Grosslein have subsequently been summarizing the ideas surfaced at the meeting and identifying the various options.

Roger Theroux is continuing to work on three manuscripts: (1) text of the bivalve report is ready for second-draft typing, (2) typing and reorganization of the northern biomass manuscript was begun, and (3) a manuscript on underwater photographic utilization is currently in preparation.

Ray Bowman finished a second draft of a manuscript describing the food of some juvenile Northwest Atlantic fish. He has also completed two speeches for presentation at the Second Annual NEFC Research Conference. Work is continuing on the feeding chronology data collected on a 1978 Soviet R/V Belogorsk cruise and on a detailed description of the food habits of silver hake from the 1973-76 data base. Judy Huebner has continued the data analysis on winter flounder, as well as studies on their digestion. Yellowtail flounder collected in February are not feeding well yet and efforts to induce feeding with live amphipods have not been successful.

Several gear loan requests have been honored as well as a request by Robert Whittaker at Cornell University for some amphipod data. We have also received notice from the publication office of the USGS that the Mid-Atlantic Bight study manuscript is being typeset and should be in print by March 1981.

Fishery Oceanography Investigation

In March, we made a good start toward pulling together our backlog of hydrographic data from MARMAP and larval Atlantic herring cruises. Dan Patanjo directed the MARMAP effort, and with the help of Bruce Davis and Ira Palmer, produced 150 sections of temperature, salinity, and dissolved oxygen distributions along the MARMAP transects for 1978 and 1979. Dan has also initiated a comparison of expendable bathythermograph (XBT) and bottle data for the transects with an eye to possible reduction in XBT costs in the future. With Ron Schlitz and Marianna Pastuczak of the Polish Sea Fisheries Institute in Gdynia, Dan has also begun to assemble nutrient data from the Georges Bank region. In addition, Arthur Allen has prepared an inventory of hydrographic data for the 1978 larval Atlantic herring patch study and Red Wright is assembling material for a series of data reports on the Georges Bank larval herring cruise series.

Computer analysis of current meter, wind, and salinity-temperature-depth (STD) data was continued by Steve Ramp and Derek Sutton. The Canadian patch study current meter data have been put into WHOI format for comparison with our own data and the Monterey wind data from Georges Bank has been transcribed and edited into the same format. The last year of Northeast Channel current measurements is now

in usable form for improved transport estimates, and work on the patch study STD tapes is continuing.

Meanwhile, processing of new data continues. Sam Nickerson instructed Marianna Pastuczak, Bruce Davis, Ira Palmer, and Roger Hernandez in the use of the Guildline salinometer and all hands polished off the stored salinities from Wieczno Cruise No. 80-01 and the first leg of Albatross IV Cruise No. AL 80-02. Sam also plotted positions and read XBT traces from those cruises.

Sea duty began to build up during the month, with Dana Densmore, Tom Laughton, Bruce Davis, Roger Hernandez, and Art Allen all putting in time on the MARMAP cruise, Albatross IV Cruise No. AL 80-02. Roger designed and the shop built a rack for six 2.5-liter Niskin bottles which may be a suitable size for MARMAP work. The new Wildco bottle was further modified, tested, and found deficient in a number of ways. Steve Ramp and Gil Dering have been readying equipment for Albatross IV Cruise No. AL 80-03, our current meter recovery cruise in April, and a preliminary planning meeting was held on 31 March with the ship's officers and lead fishermen to organize rigging and operations.

In other gear developments, Derek Sutton and Sam Nickerson have built a prototype depth-activated water sampler for use on a trawl to obtain bottom salinities; Steve Ramp has arranged acquisition of six 5-ft spheres, twelve 28-inch spheres, and a box of shackles from Navy surplus stores in Rhode Island; and Gil Dering completed building a slave event timer and clock for use with current meters.

Tim Cain left the Investigation during the month to enter a NOAA National Environmental Satellite Service computer operator training program in Washington. His position was filled by Bruce Davis. Jim King, junior fellow, returned for a week and worked primarily on salinities. Tom Laughton returned to Northeastern University for his final quarter.

Ron Schlitz traveled to Washington, DC, with Greg Lough, Geoff Laurence, and Bob Marak to look at pumping systems under development. Red Wright took part in the Canadian workshop on marine climate in Dartmouth, NS, with Greg Lough, Geoff Laurence, and Kenneth Sherman. Derek Sutton and Steve Ramp attended a workshop at URI on electro-mechanical cables, sponsored by the Marine Technology Society. Red Wright was a judge at the Falmouth Schools' Science Fair.

Larval Physiology and Biochemistry Investigation

Biochemical studies to monitor utilization of endogenous energy sources of haddock and winter flounder eggs and larvae reared at four temperatures were continued. Preliminary results gave the composition of unfertilized winter flounder eggs as 79% protein, 12% lipid, 7% carbohydrate, and 1% nucleic acid. Incubation temperatures between 2^o and 10^oC had little effect on the protein content of newly hatched larvae of either species. The protein content of larval haddock at the time of yolk exhaustion was 50% lower at 9^oC than at either 5^o or 7^oC. Daily mortality experiments are also in progress with both species in the newly designed funnel aquaria. The larvae are being maintained at 7^oC and at a plankton concentration of 0.5 organisms/ml in these studies. Mortality rates are to be calculated by daily collection and enumeration of dead individuals. Preparation of rearing facilities for striped bass embryos and larvae is in progress. This research will be in cooperation with the FWS's Columbia National Fishery Research Laboratory and will examine the influence of ambient toxicant loads in adults and eggs on subsequent larval growth and survival.

Geoff Laurence visited the Bedford Institute of Oceanography in Halifax, NS, where he conferred with personnel regarding the use of particle-counting devices in plankton research. He also visited NOAA's Engineering Development Laboratory in Washington, DC, about the development and use of underwater pumping systems in plankton and larval fish studies. Geoff attended a meeting of the Ad Hoc Committee on the Effects of Environmental Factors on Striped Bass Early Life Survival in Washington, DC, and met with staff of the FWS in Columbia, MO, concerning cooperative striped bass research planning. He attended a meeting in Woods Hole to confer with WHOI scientists about the cooperative use of in situ environmental chambers in primary-secondary production and larval fish research.

Ichthyoplankton Investigation

March was a busy month for field work. Seven members of the Investigation participated in MARMAP I surveys. We surveyed the Gulf of Maine and Georges Bank during early March in cooperation with Polish scientists, using the Wieczno. At the close of the month, Albatross IV was completing the second leg of our traditional late winter survey. After a port call at Woods Hole to take on fuel and supplies, she will begin the third and final leg, finishing up in the Gulf of Maine in early April. With the exception of larval sand lance, ichthyoplankton catches have been light. Young sand lance are again ubiquitous, but based on gross observations of the 6B5 plankton catches, they do not appear to be as abundant as in 1978 and 1979.

Ann Naplin and Cindy Fahay are preparing to discuss their ongoing research at the Second Annual NEFC Research Conference in Woods Hole during the first week of April. Ann will describe the spawning habits of three species of marine fishes, based on the developmental characteristics of eggs with time and depth of capture. Cindy will discuss results of the 2-yr survey of the New York Bight. Her talk includes information on seasonal successions of larval fish, their distribution in relation to temperature, salinity, and depth, and the diel movements of larvae of selected species.

Plankton Ecology Investigation

Regression analysis of temperature, salinity, stratification, depth, and time of day, with dominant ichthyoplankton and zooplankton taxa, zooplankton biomass, and chlorophyll data collected on Soviet R/V Argus Cruise No. 78-04 (13 April-24 May), confirmed inferences based on distribution patterns of these parameters. The abundance of the myctophid Benthosema glaciale increased with increasing temperature, salinity, and depth. Atlantic cod larvae were most abundant in areas of mixing. As previously observed by Riley and Bumpus (1946) at this season of the year, zooplankton standing stock showed a significant inverse relationship with phytoplankton abundance. No other significant correlations between physical and biological variates were observed.

Carolyn Griswold participated in the Gulf-Atlantic survey (GAS) cruise (Albatross IV Cruise No. AL 80-02) during 27 February-11 March. On 18 and 19 March, she and Mert Ingham attended a meeting of the Georges Bank Biological Task Force Monitoring Subcommittee in Woods Hole. The Subcommittee developed a short-term rig monitoring study designed to characterize the physical, chemical, and biological properties of three leased tracts which have different depth and sediment characteristics.

Donna Busch inspected fine-mesh (53 μ) bongo collections from Belogorsk Cruises No. 78-01, 78-03, 78-05, and Albatross IV Cruise No. AL 79-11 for the presence of Ceratium spp. on the Northeast's continental shelf. Observations will be combined with quantitative observations by Jay O'Reilly and Steve Esser at the Sandy Hook Laboratory, then submitted for inclusion in the spring issue of Coastal and Climatology News. Work continued on the data print-out checks and corrections. Ron Schlitz met with Donna on 26 March to discuss the status of early NEFC nutrient data.

Jack Green, Joe Kane, and Jerry Prezioso were all at sea during the month of March: Joe and Jerry on various legs of GAS I, Jack Green on Wieczno Cruise No. 80-03. Joe has completed the first draft of a paper summarizing his work on wet volume/dry weight relationships for zooplankton. Jerry has shipped to Poland aboard Wieczno all plankton samples collected in 1980 except samples from the last leg of the recent MARMAP cruise (Albatross IV Cruise No. AL 80-02).

Considerable time was spent by Robert Marak in coordinating GAS I's work on identifying petroleum hydrocarbon in fish flesh. The sampling for fish, invertebrates, and sediment has been completed from the Gulf of Maine to Mexico. The cruise report for Albatross IV Cruise No. AL 80-01 has been completed and as soon as the reports for other segments are available they will be collated into one report. A preliminary meeting to discuss disposition and analysis of these samples was held in Newark, NJ, with Jack Pearce, Donald Gadbois, H. C. Boyar, and Robert Marak. Robert Marak attended a meeting in Washington, DC, to discuss standardized fish egg, larvae, and plankton sampling with state and federal biologists involved in striped bass programs on the US East Coast. Arrangements are being made to loan MARMAP bongo gear to those who do not have it. Robert Marak, Geoffrey Laurence, Greg Lough, and Ron Schlitz met at the NOAA Engineering Development Laboratory in Washington, DC, with Moe Ringenbach's group to discuss pumping systems. The "clean" system being developed by them was demonstrated and discussions were held concerning further cooperation. Plans have been made to make optimal use of the Soviet Union's R/V Evrika when she arrives.

Bill Feltch finished measuring the size frequency of dominant species from 1977-78 spring MARMAP surveys on Georges Bank (about 170 samples). These, along with MARMAP survey samples from spring 1979, will be analyzed for shifts in size-frequency modes which may provide information on the timing of biological events associated with spring production cycles. Approximately 10% of the samples were measured by microscope to provide quality control for the data set. A comparison of manual and image system techniques indicates a time saving of approximately 70-85%.

Ray Maurer, Perry Jeffries, and Alex Poularikas are preparing a manuscript titled, "Computer Processing of Zooplankton Samples," to be presented at the Second Interagency In-Situ Sampling Workshop on 26 April in Gulf Breeze, FL. Dr. Poularikas' group has continued to build software programs for information extraction from preserved plankton images. Each measurement or statistic is tested to determine its power of discrimination. In addition, he has compiled a library of approximately 300 computer models of individual species from 10 major zooplankton groups.

Biostatistics

The computer use from the Narragansett Laboratory has increased so that we are seeking additional lines to the URI Academic Computer Center (ACC). We will install two more direct hard-wired lines to the ACC, bringing our total to seven hard-wired lines plus five data phones.

A problem in the table segment which merges zooplankton data into master files caused us a week of headaches. The table segment has been debugged, and all zooplankton data that we have in hand from MARMAP 1978 and 1979 cruises are in master files.

Plots of abundance of Calanus finmarchicus, Centropages typicus, and Pseudocalanus minutus versus surface temperature were produced. These plots were partitioned by area (Gulf of Maine, Georges Bank, Southern New England, and Mid-Atlantic Bight) and correlations were run. Contours of total ichthyoplankton, as a component of the planktonic ecosystem, were generated by survey season for 1978 MARMAP data.

Lorrie Sullivan prepared a poster presentation on butterflyfish for the Second Annual NEFC Research Conference. Julien Goulet attended two meetings, one in Narragansett and one in Woods Hole, with personnel from Input-Output Computer Services, Inc., and the Woods Hole Laboratory ADP Unit concerning development of a data dictionary system for the Northeast Regional Fisheries Information System. Cindy Jones attended a meeting in Newark with Wally Smith and Ken Sherman to discuss research on the ichthyoplankton components of planktonic ecosystems.

Apex Predators Investigation

Our efforts in March were dominated by Wieczno Cruise No. 80-03 and its preparation. Jack Casey, Wes Pratt, Chuck Stillwell, Alan Lintala, and Jack Green (from the Plankton Ecology Investigation) made 17 longline sets from off the Florida coast and edge of the Sargasso Sea to waters off Cape Hatteras. Two hundred seventy-five fish of 18 species were caught. Of these, 152 were brought on board, measured, weighed, and dissected for investigations into food habits, reproduction, age, growth, and condition factors. One hundred eleven sharks were tagged as part of our continuing migration studies. Further information is in the cruise report.

Preparations were made for two presentations at the Second Annual NEFC Research Conference. John Hoey lectured on his Ph.D. proposal which deals with analysis of longline catch data in the western North Atlantic. His proposal has been accepted by the Zoology Department at URI.

Meetings, Talks, Visitors, and Publicity

Polish oceanographer Marianna Pastuszek from Gdynia visited the Narragansett Laboratory during 26-28 March.

From 3 to 5 March, Kenneth Sherman traveled to Nova Scotia to visit the NAFO offices to discuss the Early Life History of Fish Symposium volume.

On 12 March, Kenneth Sherman attended a meeting with John Walsh and Brookhaven National Laboratory scientists to review our joint program on coastal marine ecosystems.

Kenneth Sherman and Cindy Jones attended a meeting at Washington, DC, on 19 March.

Kenneth Sherman participated in a working group meeting of the International Scientific Workshop on Management of Southern Ocean Organisms from 31 March to 2 April. He gave two papers titled: "BIOMASS: Organization of a Large-Scale Ecosystem Study," and "Status of the Stocks in the Southern Ocean."

Kathryn Busch gave a talk titled, "Middle Atlantic Bight Transports Determined from a Box Model Using Historical Hydrographic and Meteorological Data," at a seminar at the Woods Hole Laboratory on 31 March.

Mike Fahay and Chris Powell submitted an abstract for a paper titled, "An Approach to Identifying Eggs and Larvae of Urophycis - Phycis in the Middle Atlantic Bight and Gulf of Maine," to be presented at the annual meeting of the American Society of Ichthyologists and Herpetologists in June.

Publications and Reports

Cain, T. E. Temperature structure and surface salinity in the Gulf of Maine during 1979. *Annal. Biol.* (S)

Potter, D. NEFC Energy Newsletter No. 5.

RESOURCE UTILIZATION DIVISION

Fisheries Engineering Investigation

Mike Corbett, Chief Fisheries Engineer, resigned as of 28 March. Al Blott will be Acting Chief Engineer.

Isaacs-Kidd mid-water (IKMT) trawl studies continue aboard the Rorqual with the bridle and depressor towing angles being determined this month. The underwater television (UWTV) system has proven very valuable for this work. Juvenile fish samples from the IKMT have been provided for isoelectric focusing speciation studies.

John Kenney prepared a presentation detailing the IKMT study for the Second Annual NEFC Research Conference.

Work on the improved scallop drag is continuing, and Vern Nulk will present a review of this work at the aforementioned research conference. In addition, New Bedford scallop highliners were consulted about problems and solutions pertaining to scallop gear.

Jack Moakley prepared an overview of the Gloucester (MA) Atlantic menhaden purse seine fishery for the research conference.

Routine maintenance on the Rorqual continues, and the remote smoke-alarm system was installed.

The Dutch beam trawl net is in the process of being ordered. Follow-up on the performance of the heating system on the F/V Italian Gold indicates that the system is operating better than had been anticipated.

Mike Corbett and Al Blott prepared and presented a four-class course on "Hydraulics for Fishermen" in conjunction with Essex Agricultural and Technical Institute.

Plans are being made to cooperate with the Resource Assessment Division at the Woods Hole Laboratory in the design and testing of a new demersal finfish survey trawl.

Review of the manuscript "Cold Temperature Preservation of Seafoods" was completed by Dan Baker.

Facilities Engineering

Repairs to the emergency generator were completed. Freezer renovation and attempts to purchase a new steam boiler continue. Revisions to the vestibule have been designed and ordered, and work on the heating system is continuing.

Energy-use analysis indicates that the Gloucester Laboratory used about 6% more electricity this winter than last. However, gas usage has dropped 20% due to conservation measures.

Resource Development and Improvement Investigation

Seafood Composition

The surf clams were organoleptically tested after 2 mo in storage. Unfortunately, once again, as in last year's study, the live control surf clams are in a period of dormancy and are poor specimens against which to grade the frozen clams. Proximate analyses were also done on the frozen samples.

Proximate analyses were also done on sample lots of Atlantic herring for the New England Aquarium. The seals and dolphins at the aquarium are losing weight, and their herring diet is suspect.

Recovery of cholesterol through multiple extractions continues to be less than 50%. This will have to improve before samples of fish can be analyzed. A new capillary column is needed for better resolution of the fatty acids. Resolution of plant sterols is next on the agenda.

A poster showing the isoelectric focusing technique for identifying crab species to be presented at the Second Annual NEFC Research Conference in April is almost completed. It will be on permanent display in the crab lab.

Blue Crab

A storage study designed to determine the quality of pasteurized blue crab meat held in frozen storage for up to 3 mo and then thawed and held in refrigerated storage is continuing. To date, meats that were frozen for up to 3 mo and then refrigerated for 1-3 mo are of good quality.

In another experiment, pasteurized, roller-extracted meats formed into lump-meats either by steaming in a mold or by the alginate technique are being compared to pasteurized back fin meat. After 4 mo of refrigerated storage, the steam-formed lump-meats and the commercial control were significantly better than the alginate-formed meats in texture.

Squid

An Aveco fish fillet skinning machine which works on the same principle as a Steen skinner was tested on squid. The Aveco differs from the Steen in that the catch blades on the main roller are much smaller than those of the Steen. When tested on squid that had been soaked in hot, warm, and cold water, we found that washing or soaking in cold (40°F) water increased skinning efficiency and output over the warm and hot water treatment.

New Product Development

Samples of frozen Atlantic cod fillets were withdrawn from the +5.0, -5, and -20°F rooms after 6 mo of storage. The taste-test results of the steamed product showed that all the samples but the one stored at +5°F were fair to good. The sample stored at +5°F was rated as borderline to fair. The Hunter L color measurements showed very little color change in any of the samples. However, the Instron

texture measurements showed that cooked samples appeared to be getting tougher, especially the samples stored at +5 and 0°F. Very little change was noticed in the raw samples.

The storage study to determine the shelf life of "U.S. Grade A" fillets in a modified atmosphere had to be postponed because the RMF packaging machine broke down, and the new parts to repair the unit have not arrived. The experiment will continue as soon as the packaging machine is repaired.

An experiment was begun to determine the time needed to steam cook pieces of Atlantic cod fillets which were approximately 1.5 inches square. If one assumes that fish are fully cooked when the internal temperature reaches 150°F, then the tail section of the fillet should be steamed for 6.75 min, the middle section of the fillet for 9.5 min, and the heavy nape portion for 11 min. This experiment will be repeated.

Product Quality, Safety, and Standards Investigation

Product Quality

Canned Atlantic mackerel which had been prepared by food technologists at URI under a grant from the New England Fishery Development Program was rated fair to good in overall quality (appearance, odor, flavor, and texture) after 7.5 mo storage at 100°F. A commercially canned product purchased at a local store was included in the organoleptic evaluation for comparative purposes, and this product was rated good to very good. In an accelerated storage study such as this, the usual requirement is that the (canned) product be acceptable for at least 6 mo at 100°F.

Wilma has been preparing some "exotic" native seafoods, including blue mussels and goosfish (monkfish), for a demonstration for a "Boston Herald" reporter.

Additional bluefish are being analyzed for the proportion of light and dark muscle, and also the lipid content of each.

European markets have specifications for the ammonia content of imported dogfish and one country, Belgium, specifies the analytical method to be used which is a microdiffusion technique. We have been using the Association of Official Analytical Chemists (AOAC) method for determination of ammonia and are now setting up the apparatus required for the microdiffusion procedure. It is hoped that a simple method can ultimately be developed that can be used by the US Department of Commerce inspectors in grading dogfish.

The lack of steam pressure has curtailed our effort to set up a mutagen testing program, and also to initiate experiments to develop a canned bluefish.

In our red hake study after 13 wk of storage, the average peak forces as measured with the Kramer Shear Press were 400 lb for the red hake fillets stored at +10°F and 237 lb for the fillets stored at +5°F. The standard deviations were about 10% of the force value. Moisture loss from cooking was 32.8% and 26.1% for fillets stored at +10°F and +5°F, respectively. The force measurements of the +10°F samples continue to increase with each testing period. Samples stored at +5°F did not show an increase. Moisture losses also have not changed significantly.

The effect of fish temperature prior to cooking is being investigated. It appears that cooking fish thawed compared to frozen yields a softer product. An explanation for this effect is now being sought.

We have adapted our species identification by the isoelectric focusing (IEF) method to the use of agarose gels. The agarose gel technique features a number of advantages over the use of polyacrylamide for IEF. First is the fact that there

is no exposure to hazardous chemicals. Polyacrylamide gels contain acrylamide monomer which is a potent cumulative neurotoxin. Agarose gels are easy to prepare, may be stored for weeks, stain and destain faster, allow higher power levels for shorter separation time, and are not restrictive to high molecular weight proteins. Our new method allows species identifications in about 50 min as compared to 2-4 hr for our polyacrylamide gel technique. One important technique recently developed by Dr. Calvin Saravis at Harvard Medical School was the use of direct tissue isoelectric focusing (DTIEF). This allows us to separate soluble proteins without a prior extraction step by placing a small bit of tissue directly on the agarose gel. This may well be a boon to our attempts at larval fish identification. Our major problem to date has been with microscale larval protein extraction. Now we can simply place a piece or even a whole larvae directly on the gel to obtain its "protein fingerprint." With only one IEF setup, one analyst could now potentially identify up to about 500 samples in an 8-hr day. There is also a monetary savings with LKB PAGplates costing about \$1.20 per sample, while agarose gels cost about \$0.40 per sample. A manuscript tentatively titled "Fish Species Identification by Agarose Gel Isoelectric Focusing" is in preparation.

We bid adieu and best wishes to Mary Haskins who retired after 15 yr of service.

Product Safety

Samples of finfish for polychlorinated biphenyl (PCB) analysis have been received from Gulf Coast Research Labs and Montclair State College. The samples are in the process of being composited and homogenized. We are also expecting a large shipment of samples from the SWFC's Tiburon Laboratory this week.

A proposal was received from Dr. Landry of Texas A&M University in Galveston, TX, for the collection of targeted finfish species in the Galveston Bay area. A contract will be implemented shortly.

We have received four sealed vials of fish oils and one vial of undiluted PCB from ICES. Two stock standard solutions on different days as well as intermediate and working solutions were made up. Both the control and spiked oil samples have been worked up by the AOAC procedure with additional silica gel cleanup and analyzed. The experiment is being repeated. A report, as well as our chromatograms and data, will be sent out shortly to ICES.

A new set of standard solutions of Aroclor 1016, 1242, 1254, and 1260 were prepared. New stock solutions are being prepared every 6 mo.

The AS-100 autosampler is now functioning properly. A new memory board in the programmer module was installed.

The Basic II kit has been installed in the Sigma 10 microprocessor and is functioning properly.

New programs have been stored on a cassette to do a variety of jobs in relationship to the PCB work. A new program is being written on PCB's. The new program will generate PCB results in an automatic mode. Data files will be retrieved from tape in the order collected, reported, results calculated, and erased from memory.

Product Standardization

With the coming of better weather, activity on the US Army's North American Research and Development Command (NARADCOM) nomenclature project is returning to "full steam." We are continuing to assist in selection of species in a "pristine" condition of freshness.

The evaluation of products covered by the Codex Proposed Draft Standard for Fish Blocks and Codex Proposed Draft Standard for Fish Sticks and Fish Portions continues. Six major producers of sticks and portions and the US Department of Commerce Inspection Service have participated in this examination of products and the standards involved. A total of 89 lots of fish blocks have been sampled. They include several species and countries of origin. A total of 89 lots of sticks or portions made from these blocks have also been sampled. The results are presently being reviewed.

On Thursday, 13 March, a joint industry-NMFS meeting was held at the Gloucester Laboratory to discuss recent product evaluations in six processing establishments of the Codex Proposed Draft Standard for Fish Blocks and the Codex Proposed Draft Standard for Fish Sticks and Fish Portions. As a result of this meeting, US comments are being drafted for presentation at the 14th Session of the Codex Committee for Fish and Fishery Products.

We participated in planning a 1-day review of the US Department of Commerce Inspection Service's experience in using the Codex Standard for Lobsters and Lobster Tails. Dealers and processors of these products have been invited to this workshop meeting to be held in St. Petersburg, FL, the first week of April.

Joe Carver attended a joint meeting of the US Departments of Commerce and Agriculture in Washington, DC, to discuss the future of fishery specification work. Of particular interest to NMFS was Mr. Wyatt's (Acting Director of Agriculture's Food Quality Assurance Division) statement to the effect that the primary responsibility for fishery specification work will be returned to the NMFS.

Sample fillets of "Pacific snapper" were received and panel tested. Results of the panel tests indicated the product to be of "fair" quality.

A commercial item description (CID) for frozen salmon steaks was prepared for the US Department of Agriculture and submitted to our Washington Office. Also, a draft copy of a CID for canned salmon was submitted to Agriculture.

We also reviewed several Saltonstall-Kennedy Act grant proposals.

Technical Assistance

Resource Utilization Division personnel provided information and technical assistance this month in the following areas: Canadian lobster seasons; sea cucumbers; dogfish waste; US fisheries; Gloucester fishermen; fuel situation; eels; roller extraction of crab meat; squid harvesting and processing; smoking fish; organoleptic characteristics of various species of fish; gill nets; trammel nets; tub trawling, fishing vessel safety information; otter board information; effect of oil exploration on dredging; biology of New England lobsters; mercury in dogfish; moisture content of arrowtooth flounder and "regular" flounder; forthcoming meeting to review the Codex Standard for Lobsters and Lobster Tails; FCZ quotas on Loligo and Illex squid for domestic and foreign fishing; harmonization of U.S. General Standards for Grades of Fishery Products with current efforts in the Southeast and Gulf areas to increase popularity of underused species in appropriate market forms of presentation; the status of the Food and Drug Administration's (FDA) revision of its Good Manufacturing Practice for Smoked Fish and related work being done by Dr. Melvin Ecklund's group at the NWAFC's Seattle Laboratory; problems in sampling and determining amount of added phosphate in fish blocks; information to help the Southeast Region set up an assured quality program similar to the one that has grown out of the Northeast.

Meetings, Talks, Visitors, and Publicity

Meetings

Al Blott attended the Rhode Island Fisherman's Forum.

Judy Krzynowek was invited to a meeting involving the ADP Unit from the Woods Hole Laboratory to present her past efforts in record formation and manipulation on the First Data Corporation's 1022 System.

During 4-6 March, members of the Product Standardization Investigation participated in the annual workshop meeting of the Seafood Research, Inspection, and Consumer Services Division on the campus of the University of South Alabama in Mobile.

Perry Lane attended the Maine Fishermen's Forum and gave a talk on guaranteed quality of fish. He also attended the Cape & Islands Fishermen's Workshop & Exhibition in Hyannis, MA, the monthly meeting of the New England Fisheries Steering Committee, and a meeting of a Food Science & Nutrition Department Advisory Board at the Essex Agricultural & Technical Institute.

Visitors

Students from the Hamilton-Wenham Regional School discussed research activities and toured the Gloucester Laboratory.

Takeshi Takuno and Takayuki Hiria from Japan visited the Gloucester Laboratory to discuss US fisheries.

Alan Bezanson, President of DeFreeze Corporation; Ken Mauser, Director of marketing of RMF Steel Products; Allan Corning, Director of Technical Services of Ludlow's Division of Papers and Flexible Packaging; and technical personnel from Continental Can Company visited the Gloucester Laboratory to discuss the technical feasibility, and potential for botulism, of packaging unfrozen seafoods in vacuum or in carbon dioxide.

DIVISION OF ENVIRONMENTAL ASSESSMENT

Behavior of Marine Fishes and Invertebrates Investigation

Day-night lab observations on the behavior of juvenile red hake associated with adult sea scallops are continuing. Preliminary analysis reveals that changes in the availability of shelter (sea scallops) and the density of prey (sand shrimp) affect activity levels in the fish. At high densities of either shelter or food, activity is distinctly nocturnal; when densities of these critical resources are lowered, the activity rhythm is disrupted and the fish become active both day and night searching for food and shelter. The results are yielding important information on the species' habitat requirements including possible dispersal mechanisms. Integrating these results with our field observations will enable us to formulate a predictive model on the possible consequences of environmental perturbations that may potentially affect benthic communities.

Biological Oceanography of Stressed Ecosystems Investigation

The first of a series of Chesapeake Bay plume experiments ("Superflux I") occurred 11-20 March as part of the Ocean Pulse/Northeast Monitoring Program. It was a joint remote sensing - sea truth experiment in the Chesapeake Bay mouth,

plume, and shelf area with participation by NEFC, NOS, US Coast Guard(USCG), National Aeronautics and Space Administration's (NASA) Langley Research Center, Old Dominion University (ODU), and VIMS. The purposes of the experiments are to: (1) advance the development of improved remote sensing systems and techniques for monitoring and assessing regional marine resources and environmental quality; (2) to increase our understanding of regional marine ecosystem processes; and (3) to provide a synoptic, integrated, and timely data base for application to problems of ocean resources and environmental management.

Pre- and post-survey flights by VIMS Beaver aircraft on 11, 16, and 20 March provided information on the location and shape of the Chesapeake plume. The pre-survey information was used to establish station locations for the NOAA R/V Kelez. Twenty-four such stations were occupied by the Kelez from 12 to 15 March between the mouth of Chesapeake Bay and Oregon Inlet, NC, to define the three-dimensional structure of the plume in regard to temperature, salinity, dissolved oxygen, chlorophyll-a, phaeophytin, and total plankton respiration.

The first overflight of the NASA P-3 aircraft on 17 March was a cross-shelf transect from the mouth of the bay ESE to just beyond the shelf edge. Sea truth for the overflight was collected by: (1) a USGS launch in the James River from Jamestown Island to the mouth, (2) a NOAA launch from the mouth of the James River to the Bay Bridge Tunnel, (3) the ODU R/V Holton in the Bay mouth near Cape Henry, (4) the R/V John Smith from the Bay mouth near Cape Henry to about 7 nautical miles (nm) offshore toward the Chesapeake Light Tower, and (5) the Kelez from beyond the shelf break 90 nm offshore to the 40-m isobath about 70 nm offshore. Based on individual capabilities of the various surface vessels, sea truth consisted of surface or 1-m, 3-m, and 7-m samples or measurements for temperature, salinity, chlorophyll-a, phaeopigment, suspended solids (organic and inorganic fractions), phytoplankton species composition, light attenuation, Secchi disc reading, and detailed pigment samples for analysis via high pressure liquid chromatography and in vivo fluorometry. Vertical profiles of temperature were taken using an XBT. The NASA aircraft carried PRT-5, AOL and ALOPE sensors and overflew the surface vessels at 500 ft to measure sea surface temperature, chlorophyll and accessory pigment fluorescence, and turbidity.

The second overflight occurred on the morning of 19 March to map the Chesapeake plume. Again, surface vessels were stationed under the flight track in the plume area to collect sea truth data as before. The NASA P-3 aircraft flew at a 750-ft elevation using an L-band radiometer, a PRT-5, and ALOPE sensors and cameras to measure temperature, salinity, chlorophyll and accessory pigment fluorescence, and turbidity.

The third overflight occurred on the afternoon of 19 March between the mouth of the Bay and the Chesapeake Light Tower about 15 nm offshore using a NASA P-3 aircraft flying at 17 500 ft and carrying an ocean color scanner (MOCS), a PRT-5, and cameras. Again, sea truth data were collected as before, except that no samples were collected to determine phytoplankton species composition.

A fourth flight across the shelf at 17 500 ft and carrying the MOCS, PRT-5, and cameras was cancelled due to weather. All indications are that the first three flights were highly successful and that the necessary sea truth data were collected. Joint meetings are planned at which time the various data will be integrated.

The algal bioassay start-up phase was completed in February. Initial results indicate that the technique should provide valuable information on the fertility of Ocean Pulse strata for phytoplankton. Water samples, filtered and frozen at

sea, are assayed in the lab. Water aliquots receive various supplements of major phytoplankton nutrients and trace factors including nitrogen, phosphorus, silicate, vitamin B₁₂, and trace metals. The relative growth of the diatom *Thalassiosira pseudonana* in the seawater, with and without the supplements, provides indices on the availability of these substances in the seawater for phytoplankton.

The initial assays consisted of 15 samples from four stations. The nutrients and trace elements in scarcest supply and limiting phytoplankton growth at these stations are shown in Table 1.

Table 1. Limiting nutrients and trace elements for phytoplankton growth on Ocean Pulse -- Albatross IV Cruise No. AL 79-10.

Station No.	Location	Depth (m)	Limiting factor ^(a)
29	38°50'N, 75°03'W (inner shelf off Cape May)	1	N
		10	N+P
		20	N
P02	40°25.3'N, 73°11.8'W (New York Bight south of mid-Long Island)	1	N+P
		10	N+metals
		23	N+metals
		33	N+metals
P15	40°15'N, 73°39'W (New Jersey acid dump)	1	N
		10	N
		20	N
		27	N
P17	39°36'N, 73°54'W (New Jersey anoxia area)	1	N+P
		10	N
		20	N+metals
		26	N+metals

(a) N = nitrogen; P = phosphorus.

These initial results demonstrate that nitrogen was the major limiting nutrient. This is not surprising since several studies have established that N is commonly limiting in coastal waters. At least equally interesting is the limitation by metals and phosphorus. The relative importance of these nutrients for phytoplankton growth and the development of blooms along the coast, inshore and outer shelf, in estuarine and oceanic waters, will be examined over the long term.

A presentation will be made by Myra Cohn at the Second Annual NEFC Research Conference in Woods Hole on phytoplankton hot spots, a survey of phytoplankton species composition at selected stations from Ocean Pulse and MARMAP cruises covering the period of 18 September-20 December 1979. Samples examined were from stations showing greatest concentrations of chlorophyll-a as determined by the Environmental Chemistry Investigation (Christine Evans).

This spot check was conducted: (1) because of the mild winter we have been experiencing to trace possible development of a Ceratium tripos bloom such as occurred after the mild winter of 1976 in the New York Bight with accompanying anoxia; (2) to determine concentration of the diatom Coscinodiscus waileseii, large quantities of which were probably responsible for clogging of fishermen's nets in 1978 off the Delmarva peninsula; and (3) to trace the development of blooms of species such as Prorocentrum micans or Gonyaulax sp. which cause environmental perturbation and/or health hazards.

The first ADP print-out of data from our study of phytoplankton species composition from Cape Hatteras to Nova Scotia is ready this month. It gives names and counts of species present at each station, National Oceanographic Data Center (NODC) code numbers, densities, species diversity, equitability, and other parameters measured or collected during Ocean Pulse cruises.

Coastal Ecosystems Investigation

Community Structure

Ann Frame completed species identifications for benthic macrofauna samples collected by Clyde MacKenzie from three areas off New Jersey -- one which had recently been fished for ocean quahogs, one which had been unfished for at least a year, and one which had apparently never been fished. Clyde will use clustering and other analyses to determine whether differences in benthic community structure exist between the fished and unfished areas; this information may shed light on processes controlling community structure on the Middle Atlantic continental shelf.

Dave Radosh continued analysis of 1976-79 data on macrofauna distribution and abundance off the central New Jersey coast, to describe spatial and temporal patterns of benthic recolonization following the 1976 hypoxia. Dave prepared figures on this subject for presentation at the Second Annual NEFC Research Conference. Bob Reid spent most of his time on the Ocean Pulse benthic program -- choosing a contractor for processing the benthic macrofauna samples, designing new data logsheets to accommodate the expanded information to be generated under the sorting contract (including biomass, length frequency and reproductive data for dominant species), and integrating the overall benthic program with contract work to be done in the Gulf of Maine and the Delaware Bay environs. Bob also worked on: a task development plan for the Northeast Monitoring Program (NEMP), congressional testimony on the problems of PCB's in New York area dredge spoils, arranging for emplacement of a buoy in the New York Bight apex for the US Army Corps of Engineers to monitor effects of experimental dumping of such spoils,

coordinating the NMFS response to a relatively minor oil spill in Raritan Bay, and integrating the benthic programs of the NEFC's several benthos-oriented tasks.

Benthic Energetics and Ocean Pulse Coordination

This month, Frank Steimle assisted in developing final cruise plans and implementing the spring Ocean Pulse (OP) monitoring cruise using the Kelez. He also prepared an initial cruise plan for Dr. James Thomas for the second Chesapeake Bay plume study scheduled for June. He also continued to work with the Sandy Hook Laboratory ADP Unit to make further and hopefully final corrections to the bridge log and hydrographic data from all past OP monitoring cruises. He also worked with the ADP group to develop further a data management strategy for OP and the rest of the NEMP program. During this month the final draft of another edition of the "OP Newsletter" was prepared. This will be the final edition as the newsletter's functions are being absorbed in a more generalized newsletter to be produced by the State University of New York (SUNY) at Stony Brook.

Jan Ward continued to compile life history information, from literature review, on dominant invertebrates and on methods to generate these data. Russ Terranova continued the calorimetric analysis series on important finfish prey species.

Environmental Chemistry Investigation

Several members of the investigation participated in an OP cruise (Kelez Cruise No. KE 80-02) to survey the coastal/shelf water between Cape Hatteras and the Gulf of Maine. Vincent Zdanowicz made collections for heavy metal analyses in fish, invertebrate tissue, and in sediment samples taken with a Smith-McIntyre grab. Jim Duggan measured chlorophyll-a concentrations in netphytoplankton and nanophytoplankton samples taken throughout the water column.

Several members of the investigation also participated in a MARMAP survey, Albatross IV Cruise No. AL 80-02, on which ^{14}C -primary production was measured by Ralph Bruno, chlorophyll-a concentrations by Steve Fromm and Florence Wood, and seawater samples for nutrient analyses were taken by Al Matte, Michael Hurd, and William Feltsch (Narragansett Laboratory).

Ruth Waldhauer and Al Matte spent most of March calculating concentrations of ammonium nutrients, and constructing vertical and cross-shelf profiles of ammonium data collected on eight surveys (OP and MARMAP) conducted between April and December 1979. Ruth Waldhauer adapted an equation which calculates great circle distance (given as input latitudes and longitudes of two station locations) to a TI-59 programmable calculator. This greatly facilitated plots of cross-shelf profiles of nutrient data. They also assisted the ADP Unit at the Sandy Hook Laboratory by providing this equation so that the OP information system can automatically retrieve and contour-plot archived data.

Andrew Draxler continued to refine the design of our automated continuous ultraviolet (UV) digester which will be used to measure dissolved organic nitrogen (DON) in seawater samples collected on OP and MARMAP surveys.

Ruth Waldhauer also assisted the New Jersey Marine Sciences Consortium with analyses of ammonium in their studies of Horseshoe Cove, Sandy Hook Bay.

Andrew Draxler also prepared and delivered an oral presentation titled "Nitrogen Excretion and Oxygen Consumption as In Situ Measures of Stress in Asterias vulgaris and Porana insignis" to be delivered at the Second Annual NEFC Research Conference to be held at Woods Hole during 1-3 April.

Chris Evans continued to proof contoured distributional maps of weighted average chlorophyll-a concentrations measured during fall and winter 1979 OP and MARMAP surveys. Florence Wood and Steve Fromm replaced Susan Barker and William Hogelin in the chlorophyll subtask, and were trained in shipboard methods for chlorophyll analyses.

Jay O'Reilly and Donna Busch (of the Ecosystems Division at the Narragansett Laboratory) edited computerized data on rates of ^{14}C -phytoplankton primary production measured during the Belogorsk Cruises No. 79-01 and 79-03 and Albatross IV Cruises No. AL 79-06 and 79-07.

Jay O'Reilly, Dr. Steven Esser (New Jersey Marine Sciences Consortium) and Donna Busch examined netphytoplankton double-oblique tow collections made with a 53- μm mesh net during the November-December Delaware II (Cruise No. DE 79-13) and March-April Albatross IV (Cruise No. AL 80-02) surveys to determine the abundance and distribution of Ceratium tripos, a dinoflagellate which contributed to the extensive and persistent anoxia off the coast of New Jersey in 1976. C. tripos densities at mid-New York Bight shelf waters in early March 1980 ranged between 177 and 257 cells/liter. If the Ceratium population grows at the same rate as it grew in spring 1976, and if the population is compressed vertically either through phototaxis or sinking into a 3-m stratum, then by the end of May densities of C. tripos could reach 108 cells/ml, or nearly half the maximum concentrations measured at the base of the pycnocline prior to the 1976 anoxia. A report on our observations was drafted and will be distributed throughout the NEMP network. Additionally, seagoing technicians measuring chlorophyll and primary productivity on the MARMAP (Albatross IV Cruise No. AL 80-02) survey currently underway, will attempt to isolate C. tripos by serially washing selected cells with sterilized F/50 artificial seawater media. C. tripos isolates will be provided to Paul Falkowski (Brookhaven National Laboratory), Tom Malone (Lamont-Doherty Geological Observatory), and John Mahoney (Sandy Hook Laboratory) to increase the probability of successfully culturing this species so that its nutritional and environmental requirements may be determined.

Jay O'Reilly, Frank Steimle, and Pat Fournier (ADP Unit at the Sandy Hook Laboratory) continued to edit all computer-archived OP data on oxygen, salinity, and temperature. We also revised a hydrographic computer program which will be used to calculate percent of oxygen saturation, sigma-t, and seawater pH and alkalinity measurements made during OP surveys.

Physiological Effects of Pollutant Strees Investigation

The long-term exposure of the slipper limpet (Crepidula fornicata) to silver continued this month. The seawater was turned off because of a salinity problem, and while the water was off the temperature rose to 13.0°C in the aquaria. This increase in temperature resulted in a large number of animals producing egg masses. The development of these eggs is being monitored.

Three American oyster (Crassostrea virginica) egg experiments have been performed using mercury as the toxicant. The first two experiments were used to work out technique problems. None of the data collected so far are usable.

A 48-hr bioassay to determine the effects of mercury, copper, silver, zinc, lead, and nickel on embryos of the blue mussel (Mytilus edulis) at optimal temperature-salinity regimes was performed this month.

Oysters collected last month from the Quinnipiac and Housatonic Rivers and from Long Island Sound near Greenport, NY, are now being conditioned for future spawning to study egg viability. Metal-uptake determinations of these oysters are

now being performed and analyses are nearly complete. Several oysters were obtained from the Aquaculture Division's Aquacultural Genetics Investigation and were analyzed for a number of metals to provide that group with some background information on the metal content of their samples. Analysis of the results is nearly complete.

Analyses of harbor seal liver and kidney tissues for metals have been completed and muscle tissue samples are nearly completed.

Physiological Effects

A cooperative study with the Biochemistry Subtask continued this month. Sea scallops (Placopecten magellanicus) exposed to silver for 30 days were examined for changes in serum ions and gill-tissue oxygen consumption.

Analyses of blood and respiratory changes in windowpane (flounder) exposed to mercury were performed this month and the information derived was used with data from a field survey of windowpane for a presentation at the Second Annual NEFC Research Conference in Woods Hole.

Work continued on Ocean Pulse cruise samples, on examination of various gill tissues with the scanning electron microscope, and on a study of silver-exposed rock crabs (Cancer irroratus). Preparations were made for the spring Ocean Pulse cruise on the Kelez and task members participated in the second and third legs of that operation.

Biochemical Effects

Analyses were completed on adductor muscle from sea scallops that had undergone either a 30-day or 60-day silver or a 30-day cadmium exposure (both 10 ppb). Of the four energy-related enzymes assayed, only PK was elevated in the silver-exposed animals, at both 30 ($P < 0.025$) and 60 ($P < 0.05$) days, whereas the 30-day cadmium animals had elevated ODH ($P < 0.001$), PK ($P < 0.005$), and AAT ($P < 0.01$); only MDH -- a very good indicator of sublethal stress in lobster tissues -- showed no significant change. The ODH in scallop adductor muscle perhaps, may perform functions analogous not only to LDH, but also to at least one of the MDH isoenzymes.

Tissues were taken from scallops in the second 30-day exposure to silver. One portion of the gill samples was freshly homogenized and frozen, and has already been analyzed for glycolytic and pentose shunt activity; another portion of gill samples was lyophilized and archived at -80°C to await development of the spectrophotometric ATPase assay we're working on.

Pooled samples of hearts were taken from rock crabs exposed for 7 wk to 40 ppb silver or fed for the same period of time with silver-contaminated mussels (see "Physiological Effects").

Research and development continued with several enzymes we hope to add to the suite of metabolic stress indicators in scallop muscle; glutamate dehydrogenase and arginine kinase are ready for use.

Heart samples were analyzed from American lobsters exposed to lead (50 ppb) for 1 mo and then held for 2 days at either ambient (26 ppt) or low (17 ppt) salinity. Data analysis should be completed in another week.

The NOS Philadelphia dumpsite cruise (Kelez Cruise No. KE 80-01) was hampered by foul weather and a malfunctioning winch. We got a proper sample (13 animals) from only one station, somewhat south of the dumpsite; we have yet to get a good sample of field-stressed scallops.

We are also participating in the current spring Ocean Pulse cruise (Kelez Cruise No. KE 80-03 -- the southern leg). The final leg (Kelez Cruise No. KE 80-04) will be the northern one, during which we hope to obtain scallops from that anomalous deepwater population in the Gulf of Maine found at 170 m, as well as on mini-banks like Fippennies Ledge and Platts Bank (about 70 m). The commercial scallopers have just started to exploit this population which the Resource Assessment Division has been following for the past few years; we're anxious to obtain samples of the same stock taken from widely differing depths before they may be significantly reduced.

Three manuscripts were sent out in three different stages: one for review, one amended in response to reviewer's comments, and one completed as a galley proof.

Anaerobic Bacteriology/Metabolism

As part of our Ocean Pulse activities, lab studies are continuing on the characterization of the many field isolates of bacteria collected. Previously we reported that with our identification system, some 40% of our isolates remain unclassified under our present schemata. Additional biochemical tests have now been used including antibiotic sensitivity, blood haemolysis, substrate degradation, toxin production, etc., to further characterize the isolates. Some of these tests can be used to further separate the isolates and attempts will be made to use them in a field-monitoring mode. Clostridia, other than C. perfringens, are also being detected. Studies to date show that C. tetani are present, which could be of concern to offshore drilling activities.

Other activities were directed to preparation for the Ocean Pulse cruise aboard the Kelez during 24 March-10 April.

Meetings, Talks, Visitors, and Publicity

Dr. A. Calabrese attended the US Department of Commerce's Advanced Management Seminar in Washington, DC, during 17-21 March.

Dr. John Graikoski served as a judge in the Connecticut State Science Fair for junior and senior high school students on 18 March. He also taught Oceanography Merit Badge at the Boy Scout Merit Badge College held at Quinnipiac College. Dr. Graikoski also served as a member of a project review team for the NMFS Micro-constituents Program at Pascagoula, MS, on 25 and 26 March.

Mr. Richard Greig attended the Pittsburg Conference on Analytical Chemistry during 10-14 March in Atlantic City, NJ.

Miss E. Gould attended a meeting of the Center Awards Committee at Woods Hole on 6 March.

Frank Steimle attended a 2-day meeting on 12 and 13 March at the Marine Ecosystems Analysis Program (MESA)-New York Bight Office on Long Island with Jack Pearce and Bob Reid to discuss the NEMP planning document, data management problems, and field work integration.

On 21 March, Frank met with Drs. Ken Able and Churchill Grimes of Rutgers University to discuss a possible cooperative effort in examining the trophic energetics of tilefish.

On 25 and 26 March, Frank attended a NEMP regional meeting in Easton, MD, with Jack Pearce and Jim Thomas.

Ann Frame, Dave Radosh, Bob Reid, Frank Steimle, Russ Terranova, and Jan Ward attended the Annual Benthic Meeting held in Williamsburg, VA, on 29 and 30 March.

On 4 March, Jay O'Reilly, Andy Draxler, Ruth Waldhauer, and Al Matte met with Sukwoo Chang and Tony Pacheco to discuss the development of monitoring "flags" or levels of nutrients, chlorophylls, and heavy metals which would be significantly above (or below) normal or baseline to alert the NEMP network.

On 26 March, Jay O'Reilly met with Dave Grant and colleagues (New Jersey Marine Sciences Consortium) to review the Consortium's studies of nutrients, chlorophylls, and productivity in the Horseshoe Cove marsh, Sandy Hook Bay.

In March, Dr. John Pearce completed the draft ICES oil spill response document and submitted it to the ICES Advisory Committee on Marine Pollution's semi-annual meeting for approval by the Committee members to be used as an ICES Cooperative Research Report.

Dr. Pearce participated in the 301(h) workshop concerned with secondary sewage treatment outfalls along the US coastline. The workshop was convened to review waiver applications from several New England and New York metropolitan communities. The committee is especially concerned with the effects of pollution from primary outfalls on living marine resources.

On 12 March, Dr. Pearce convened a meeting of the NEMP management team at SUNY at Stony Brook. The management team is finalizing the Program and Task Development Plans for the combined NOAA/NEMP program.

On Monday, 17 March, the Sandy Hook Laboratory hosted the New Jersey Atlantic Coast Shellfish Council monthly meeting. Over 30 participants came from various fishing organizations in northern and central New Jersey. Dr. Pearce chaired the meeting which was principally concerned with new regulations governing shellfishing activities in the State of New Jersey.

On 21 March, Drs. Marvin Grosslein, Richard Langton, and John Pearce, and Mr. Frank Steimle and Mr. Robert Reid met at Sandy Hook Laboratory to develop a report to the Center Board of Directors concerned with the future direction of benthic research within the NEFC. A draft report was completed and will be prepared as a final report for the Board of Directors.

On 20 March, Mr. Robert Marak, Mr. H. C. Boyar, Mr. Don Gadbois, and Dr. John Pearce met at Newark Airport for a cruise debriefing for the Gulf and Atlantic petroleum hydrocarbon survey cruise. Mr. Marak reviewed the status of the cruise results and distributed charts and other information concerned with station locations and sample collections.

Also on 20 March, Dr. Pearce presented a seminar on NEMP to the Sigma Xi Society, Northern New Jersey Chapter.

On 25 and 26 March, Dr. Aaron Rosenfield and Dr. John Pearce convened a meeting to brief academic, state, and other federal institutions and personnel on the status of NEMP in Chesapeake Bay waters. The meeting was especially concerned with use of remote sensing techniques for monitoring environmental variables in Chesapeake Bay and the Chesapeake Bay plume. The meeting is to be followed up by a small planning meeting on 17 April at NASA's Langley Flight Center. This meeting will bring together representatives from several state and federal agencies, as well as from various academic institutions in Chesapeake Bay. These persons will discuss the implementation of a remote sensing and monitoring program that will involve several agencies.

On 28 March, Dr. Pearce met with Dr. Robert Abel, New Jersey Marine Sciences Consortium, and Director, Sea Grant Programs, and Mr. Steve Anastasion, National Advisory Committee on Oceans and Atmosphere, to discuss ocean engineering and technology as it might apply to monitoring and research programs such as NEMP.

Publications

MacKenzie, C. Management for increasing clam abundance. Mar. Fish. Rev. 42(10):10-22;1979. (P)

Steimle, F. W. Monitoring of New York Bight for low levels of dissolved oxygen. Coast. Oceanogr. Climatol. News 2(2):19-20;1980. (P)

AQUACULTURE DIVISION

Aquacultural Genetics Investigation

Experimental Hybridization of Commercial Oysters

A few commercial Japanese oysters (Crassostrea gigas) were obtained for additional experimental hybridization with the commercial American oyster (C. virginica).

Geographic hybridization continues between the American oyster local to Long Island Sound and oysters from Massachusetts. Several cultures of larvae currently are surviving and growing well.

Mass Selection of the Commercial American Oyster

We are continuing to study selection response in 4-yr-old and 2-yr-old oyster brood stock (C. virginica). Two crosses among the large 4-yr-olds, three crosses among the small 4-yr-olds, and three crosses among the large 2-yr-olds have been made thus far. In addition, we are attempting to produce more crosses in the larval selection experiment. Only one cross, from the late-setting line, has been successful during the past month.

The 1979 year-class oysters have been almost fully separated from the excess cultch material. This year class is also being counted and sampled for measurements.

Oysters overwintered in Milford (CT) Harbor were examined for winter kill, and appear to have overwintered well. They have been spread out in preparation for early spring growth, and additional oysters from indoor holding tanks moved to the Harbor.

Cytology and Cytogenetics of Developing Eggs of Commercial Fish

Analyses of the 1978 collection of Atlantic mackerel eggs from the New York Bight are nearing completion. These analyses will finalize the studies on eggs of the Atlantic mackerel from surface waters of the New York Bight. In addition to collecting data on stations sampled for analytical chemical tests of indicator contaminants (MESA contract), other stations were studied as well as part of the NMFS program. With methodologic procedures well worked out and the accumulated expertise of two prior year classes, it was possible to collect more in-depth information on the 1978 than on the 1977 samples and still retain the larger areal coverage of the 1974 study. The 1974 and 1978 data on mitotic chromosome errors at gastrulation should give a good indication of strictly mutagenic effects. This is as opposed to the cytologically estimated egg moribundity only partly attributable to dominant lethal mutations which was depended upon in the earlier statistical correlation of the 1977 biological and contaminant data.

This mackerel study is the first effort to measure any effects of environmental mutagens on a commercial resource species, and probably the most in-depth examination of the earliest development stages (cleavage through the tail-free embryo stage) of a commercial fish species. It will hopefully find use then, not only as a piece of contaminant research, but also as an examination of reproduction of a commercial species in a real-life situation with variable natural and unnatural stresses. Approximately 70 sample sites, three year classes of eggs, and microscopic examination of 20 000 mackerel eggs were included in the study. At 15 sites microlayer and subsurface water and plankton were analyzed for aromatic and chlorinated hydrocarbons; microlayer and subsurface water were also analyzed for heavy metals (MESA contract to the NOAA National Analytical Facility in Seattle, WA). S. Chang of the Sandy Hook Laboratory will be responsible for the final statistical analyses of the data for associations between variable temperature, salinity, and contaminant loads of sample sites, and plankton and mackerel egg health as measured by the state of the embryo cells and mutation rate of the embryo's dividing cells. The presence of significant amounts of chromosome-damaging contaminants in mackerel roe analyzed in conjunction with this overall study points up the significance of using chromosome tests in measures of the effects of environmental contaminants on the reproductive performance of commercial and sport fish species.

Spawning and Rearing of Mollusks Investigation

Laboratory-ripened bay scallops (Argopecten irradians) were spawned twice in March, officially beginning our 1980 effort with this species. These spawnings yielded 6.5 and 12.0 million eggs, respectively; development to the larval stage was 33% and 26% for these two populations. We are collecting data on our costs of hatchery production this year so that we can make a cost analysis of our scallop seed. We are installing some specially designed, laboratory-built equipment to make our operation more efficient in both labor and energy.

Preparations are underway for this summer's field studies which will monitor the growth of hatchery-reared surf clams (Spisula solidissima) maintained in protective enclosures in Long Island Sound. Concurrent experiments are planned which will compare the growth of the field-planted clams to analogous groups maintained in the pumped-raceway, tank-farm system. About 20 000 hatchery-reared seed clams of two size classes will be used in the study. One aim of the study is to determine whether the rapid growth rates of surf clams, recorded in the pumped-raceway system, are unique to the site or similar growth can be expected in Long Island Sound. Physical and chemical measurements will be made for both situations and an attempt will be made to compare the amounts of chlorophyll-a suspended in the seawater. From our previous records of chlorophyll levels, the planned field measurements should allow us to make predictions about growth rates. An appraisal will be made of the economics of these two approaches to the grow out of hatchery-reared bivalve seed.

About 200 adult surf clams were collected from Jerusalem, RI. These animals will serve as brood stock for future culture efforts. A subgroup of these animals is being maintained at elevated temperatures to initiate gametogenic conditioning.

We spawned American oysters weekly in March and provided 25 million eggs to various Milford Laboratory programs.

Meetings, Talks, Visitors, and Publicity

Patricia Werner, a high school student from West Haven, CT, visited the Milford Laboratory to discuss a science fair project on predation in the oyster bottom community. She recently reported that she had won first prize.

We provided oysters for spawning to C. Cetta at WHOI.

E. Rhodes presented a paper on bay scallop aquaculture at the World Mariculture Society meeting in New Orleans, LA, during 5-8 March.

E. Rhodes presented a talk on the use of raceways for the intermediate grow out of bivalves at a NOAA Office of Coastal Zone Management (CZM) Coastal Energy Impact Program workshop in Boston, MA, on 24 March.

J. Goodsell of Marine Research, Inc., in Groton, CT, visited on 18 March to discuss bay scallop research.

We hosted a class in aquaculture from Suffolk County Community College in Riverhead, NY, on a Milford Laboratory tour with emphasis on our aquaculture research.

B. Smith, R. Valdez, and G. Smith from the Shinnecock Tribal Oyster Project in Southampton, NY, visited to discuss their new hatchery plans and mutual research interests.

S. Stiles and E. Losee attended the World Mariculture Society meeting during 5-8 March in New Orleans, LA, in conjunction with the American Catfish Farmers, the Fish Culture Section of the American Fisheries Society, and the U.S. Trout Farmers Association. On 7 March, both attended a meeting of the Genetics Task Force of the World Mariculture Society.

A. Longwell participated in an ad hoc meeting in Washington, DC, on striped bass research.

Visitors to the Aquacultural Genetics Investigation included Dr. Gary Newkirk, a Geneticist at Dalhousie University in Halifax, NS, and Fred Stevens of Aquacultural Research Corp. in Dennis, MA.

Publications

Rhodes, E. Some aspects of the controlled production of the bay scallop, Argopecten irradians. Proc. World Maricul. Soc. (S)

PATHOBIOLOGY DIVISION

Comparative Invertebrate Pathology Investigation

Members of the Investigation (i.e., Farley and Kern) were contacted by staff members of the Aquaculture Genetics Investigation at the Milford Laboratory and asked to investigate recent mortalities of hatchery-reared oysters being used for breeding studies. Histologic examination of samples of these oysters revealed apparent physiological stress with no apparent pathogens present. The animals also were stunted. Chlorophyll fluorometry data indicated that the oysters were receiving an inadequate food supply. Inadequate food would account for the type of pathology observed in the histologic sections.

Ms. MacLean, Chairperson for the Second Annual NEFC Research Conference in Woods Hole, and other NEFC staff members spent considerable time in preparing presentations and organizing the program. Response to the call for papers was good and indicates a strong interest among the junior scientists in the NEFC in meeting and exchanging information with members of other NEFC laboratories. The

program consists of 49 oral presentations and 13 poster contributions as shown in Table 2.

Table 2. Presentations/contributions at the Second Annual NEFC Research Conference in Woods Hole during 1-3 April 1980.

Laboratory	Oral	Poster
Gloucester	4	4
Woods Hole	16	3
Narragansett	2	4
AEG	4	0
Milford	12	1
Sandy Hook	9	1
Oxford	2	0

Samples of blue mussels were received or collected from Wachapreague, VA; Lewes, DE; and Cape May, Great Bay, and Raritan Bay, NJ. Samples of American oysters were also received from Great Bay and Raritan Bay for Ocean Pulse histologic studies. Sections of sexually mature blue mussels from Searsport and Clarks Cove in the Damariscotta River, ME, were examined histologically -- each of the two samples revealed 12-13 pathologic conditions. Inflammatory lesions were most abundant in the Clarks Cove sample. A kidney parasite, possibly of the genus Pseudoklassia, was seen in one animal from Clarks Cove. This sample also revealed a 2% prevalence of ciliate xenomas, 8% prevalence of metacercaria, probably of the genus Gymnophalus, and a 2% prevalence of copepod abscesses. In contrast, the Searsport sample contained fewer lesions but had a 68% prevalence of Gymnophalus sp. metacercaria. Seven percent of the sample had abscesses caused by copepod infestations. In comparative pathology studies for Ocean Pulse and Mussel Watch Programs, numerical baseline data were collected from histologic examination of 20 samples of blue mussels from diverse locations. Observations noted included stage of gametogenesis, type of lesion (by tissue), and prevalence of internal parasites.

The Histology Unit blocked and sectioned over 700 specimens and prepared over 1000 slides for histologic examination.

Microbial Ecology and Parasitology Investigation

The first collection of rock crabs for a MESA monitoring study was made by Mark Galasso and John Ziskowski. The collection was made in Sandy Hook Bay and the New York Bight apex, and was timed to coincide with the molting cycle of adult males. The monitoring effort has been designed to follow seasonal variations in the numbers of crabs with "black gills" or other signs of obvious disease or stress. Histological studies on tissues and organs, which require a major investment of time and effort, are being minimized in order to maximize the numbers of crabs that may be examined for visible signs of disease. It was anticipated that during the January-March quarter, 90-95% of the specimens from Sandy Hook Bay would have clean gills as a result of molting activity and we obtained a value of 95% (see Table 3). We expected approximately 78% of the ocean specimens to have clean gills but obtained a value of 62%. The disparity between expected and actual figures

probably resulted from the fact that the collection was made at the end of the January-March quarter rather than during the middle of the quarter. Black gills were not observed during the January-March quarter which was not surprising since historical data have shown that only 0-2% of the crabs have black gills during the molting period. Two specimens, both from the ocean stations, had black ulceration or erosion of the carapace. One crab had clean gills on one side and extremely discolored gills on the opposite where it was noted that the gill raker was missing. Previous histological studies have shown that in severely stressed crabs the setae of the raker may be occluded by diatoms, and nodules may be present in the epidermis. Diseased or nonfunctioning rakers in stressed crabs are sometimes associated with crabs which have one set of black gills and one set of clean or discolored gills. The results of the March 1980 collection are shown in Table 3.

Table 3. Prevalence of "black gill disease" in offshore and inshore populations of rock crabs during January-March.

Location	No. males	No. females	No. clean	No. discolored	% clean
Sandy Hook Bay	21	0	20	1	95
Ocean	<u>41</u>	<u>4</u>	<u>28</u>	<u>17</u>	<u>62</u>
Totals	62	4	48	18	73

Data from the above table illustrate the influence of molting crabs in Sandy Hook Bay on cumulative or combined data (i.e., 95% clean versus 62% in ocean crabs).

Diseases of Larval Mollusks Investigation

The 1-yr anniversary trip of the monthly Long Island Sound shellfish bed sampling program was completed on 21 March. This study concentrates on enumerating and isolating marine bacteria in the water column and sediments associated with shellfish beds. Of the 527 bacterial types tested, 2% were found to be pathogenic to developing American oyster eggs. Dissolved oxygen, pH, salinity, and temperature readings are taken in conjunction with the bacterial sampling.

In microbial identification service work, a total of 93 biochemical and morphological tests were performed on shellfish larval pathogens isolated from hatcheries in Maine, California, and Prince Edward Island. All were identified as Vibrio, with the California isolate most resembling the emerging archetype of V. anguillarum (Evelyn 1971). A total of 12 challenge tests with Crassostrea virginica and one test with C. gigas confirmed the pathogenicity of the Maine and California isolates. A manuscript for possible presentation at the 1980 National Shellfisheries Association meeting on Cape Cod, MA, is in preparation describing these results. Reports of these identifications have been sent to the hatchery managers to assist them in control measures.

The study comparing oyster embryonic development (to the straight hinge stage) in 10- μ m-filtered, UV-treated seawater with development in 10- μ m-filtered, charcoal-filtered, UV-treated seawater shows that the average live, normal development is greater (about 10%) in seawater filtered through charcoal.

Electrophoretic attempts to isolate the toxic metabolite produced by a shellfish-pathogenic Vibrio sp. are continuing. A 40-fold reduction in the volume of

the bacterial filtrate, accomplished through dialysis, allowed us to obtain a single protein band following an electrophoretic run. A further reduction will be made to determine whether any minor bands can be detected.

Since a regular supply of oyster larvae is again available, experiments on the cellular responses of larvae to pathogenic bacteria have been resumed. These are designed to obtain a firmer statistical basis for the observation that surface-attaching cell types (presumably immune defense cells) undergo a shift in relative percentages upon exposure of larvae to pathogenic *Vibrio* sp. Larvae have also been grown and their surface-attaching cells prepared for scanning electron microscopy in order to compare microstructure with morphology of the same cells under light microscopy.

Fish Pathology Investigation

The final report to the MESA New York Bight Project Office for funding received in FY79 has been completed. The report, a joint preparation with J. Ziskowski, M. Sherwood (Southern California Coastal Water Research Project in Los Angeles, CA), and B. McCain (NWAFC) compares and summarizes data on fin rot disease of Dover sole, starry flounder, and winter flounder from California, Washington, and New York, respectively. The report was prepared in manuscript format so that after appropriate revision by coauthors it can be submitted for publication.

Mr. Ziskowski participated in the Ocean Pulse Gulf of Mexico cruise from 4 to 25 February. He collected fish tissues for histology and mutagenesis testing from 18 species of fish at 18 sampling stations on the cruise track. Altogether, 85 fish were necropsied and gill, gonad, and liver tissues excised and fixed in 10% seawater Formalin. Gonad and liver tissues from 183 fish were frozen for mutagenesis testing. After tissues were excised for histology and mutagenesis, fish were carefully wrapped in aluminum foil for later discretionary chemical analysis. Butterfish were sampled at four stations, spot at three stations, pinfish and vermilion snapper at two stations, and the remaining 14 species were sampled at only one station. Histologic samples only were taken from black sea bass, silver hake, and round scad; mutagenesis samples only were taken from spotted hake, porgy, round herring, Spanish sardine, and longspined porgy. Both histologic and mutagenesis samples were taken from summer flounder, Atlantic mackerel, butterfish, pinfish, vermilion snapper, tomtates, goatfish, weakfish, and sea catfish.

Collection of anadromous clupeid fishes began this month with the help of the staff of the Maryland Tidewater Administration. The fish will be examined for the presence of IPN virus. When feasible, captive alewife, blueback herring, and hickory shad will be kept alive in the lab for experimental studies of virus infectivity. Juvenile American shad have already been infected and killed by the virus. Attempts to visualize the virus in tissues of experimentally infected Atlantic menhaden and American shad continue. To date, diligent searching with electron microscopy has not been successful, although virus was cultured from the same fish.

Considerable effort focused on the preparation for and conduct of research on larval haddock and winter flounder. Through the courtesy of G. Laurence and A. Smigielski at the Narragansett Laboratory, normal larvae of both species (from the time of hatching) have been collected and preserved for electron microscopic study. Experiments on 4-wk-old larvae exposed to a calculated dose of 500 ppb Cu^{++} have demonstrated that after 18 hr 50% of the haddock larvae and 20% of the winter flounder are dead (controls: 15% haddock and 5% winter flounder dead over same time interval). The experimental and control animals were preserved for fine structural observation with an emphasis on examining the sensory systems.

Mr. Newman and Dr. Murchelano spent much time during the month discussing striped bass research with potential collaborators.

Meetings, Talks, Visitors, and Publicity

Dr. Rosenfield attended a Fish Health Panel meeting and a National Shellfisheries Association Board of Directors meeting at New Orleans, LA, during the week of 4 March. He also attended a Striped Bass Research Planning Committee meeting in Washington, DC, on 13 March, and a Joint Subcommittee on Aquaculture meeting in Washington, DC, on 14 March.

Mr. Lewis participated in a cruise on the Kelez from 27 February to 7 March to collect crabs for disease studies and sediments for protozoan studies.

Ms. Hines attended a course on Library Computer Information Systems in Rockville, MD, during the week of 4 March.

Dr. Blogoslawski and Mr. Kern attended a Center Incentive Awards Committee meeting at Woods Hole, MA, on 4 and 5 March. Mr. Kern also conferred with personnel at the Milford Laboratory on 6 and 7 March in regard to lab oyster mortalities.

Dr. Murchelano attended a Center Ship Committee meeting and presented a lecture on fish diseases to the staff of the Resource Assessment Division's Resource Survey Investigation at the Woods Hole Laboratory on 5 March. Dr. Murchelano and Mr. Newman attended a Striped Bass Research Planning Committee meeting in Washington, DC, on 13 March.

Dr. Robohm presented a talk and discussed careers in marine microbiology at Daniel Hand High School in Madison, CT, on 14 March.

Dr. Sawyer and Mr. Lewis attended the Second International Workshop on Small Free-Living Amoebae held in Gainseville, FL, during 24-26 March. Dr. Sawyer presented a talk on "Shared Cyst Characters and Their Potential for the Incorrect Identification of Species of Acanthamoeba" and Mr. Lewis' presentation was titled "Frequency Distribution of Free-Living Limax Amoebae in a Natural Fresh- to Salt-Water Estuarine System."

Dr. Bodammer conducted an experiment with larval fish at the Narragansett Laboratory during the week of 24 March.

Mr. Galasso collected rock crabs for Ocean Pulse monitoring at Sandy Hook, NJ, on 26 March.

Ms. Jacquelyn Swing, a temporary biological aid, entered on duty 24 March. She is being trained to assist in the identification, examination, and data collation of zooplankton in the Deepwater Dumpsite (DWD) 106-Ocean Pulse studies.

Mr. Barry Nawoichik is leaving the Pathobiology Division at the Milford Laboratory after 3 wk of cooperative work.

A program review was held at the Oxford Laboratory on 11 March. Members of the Investigations from the Oxford and Milford Laboratories attended, as well as Dr. Douglas Lipka of NMFS in Washington, DC, Ms. Elaine Chan of NMFS in Washington, DC, Dr. Carl Sindermann of the Sandy Hook Laboratory, Dr. George Ridgway representing the Center Director, and Mr. Charles Frisbie of the Tidewater Administration in Annapolis, MD.

Visitors to the Oxford Laboratory during the month included Dr. Joseph Osterman of the Department of Rickettsial Diseases for Walter Reed Army Medical Center; Mr. Tim Cole, Ms. Joyce Meritt, and Ms. Naomi Massey of the Center for Environmental and Estuarine Studies in Cambridge, MD; Mr. Peter Jensen and Mr. Robert Rubelmann of the Tidewater Administration; Senator John Chafee (R-RI); and Mr. William G. Gordon of NMFS in Washington, DC.

Publications

- Brown, C. A study of two shellfish-pathogenic Vibrio strains isolated from a Long Island hatchery during a recent outbreak of disease. (Abstract). Proc. Natl. Shellfish. Assoc. (S)
- Johnson, P. T.; Farley, C. A. A new enveloped helical virus from the blue crab, Callinectes sapidus. J. Invertebr. Pathol. 35:90-92; 1980. (P)
- Lewis, E. J.; Sawyer, T. K. Frequency distribution of free-living limax amoebae in a natural fresh- to salt-water estuarine system. (Abstract). Proc. Sec. Inter. Conf. Small Free-Living Amoebae. (S)
- Murchelano, R. A. Some pollution-associated diseases and abnormalities of marine fish and shellfish: a perspective for the New York Bight. Ecol. Stress N.Y. Bight: Sci. Manage. (A)
- Murchelano, R. A.; Ziskowski, J. Fin rot disease in the New York Bight - 1973-1977. Ecol. Stress N.Y. Bight: Sci. Manage. (A)
- Murchelano, R. A.; Rosenfield, A.; Swann, B. J. An international Registry of Marine Pathology. (Abstract). Inter Coun. Explor. Sea. (A)
- Newman, M. W. IPN virus disease of clupeid fishes. (Abstract). Inter. Coun. Explor. Sea. (A)
- Sawyer, T. K. Distribution and seasonal incidence of "black gill" in the rock crab, Cancer irroratus. Ecol. Stress N.Y. Bight: Sci. Manage. (A)
- Sawyer, T. K. Shared cyst characters and their potential for the incorrect identification of species of Acanthamoeba. (Abstract). Proc. Sec. Inter. Conf. Small Free-Living Amoebae. (A)

NATIONAL SYSTEMATICS LABORATORY

Penaeoid Shrimp Investigation

Work was done on the description of a new species of rock shrimp (Sicyonia) from the American Pacific. Morphological variation of the Indo-West Pacific shrimp Solenocera melantha was investigated.

Crustacea Investigation

Preparation continued of a manual of the temperate water decapods of the US East Coast. Crabs from Tursiops stomachs were identified for the Smithsonian.

Pelagic Fishes Investigation

Counts of fin rays and vertebrae from 140 specimens of Scomberomorus were added to the data base. The evolutionary relationships of American species were compared with the relationships of their parasitic copepods. A valuable shipment

of study material of pelagic fishes was received from the People's Republic of China. Assistance was given to the Smithsonian with an inventory of their large, tank-stored specimens of scombrid fishes. Sorting and preliminary identifications were made of 400 lots of mangrove fishes taken during an R/V Alpha Helix cruise to New Guinea in which Bruce Collette participated.

Benthic Fishes Investigation

Work was done on the families Argentinidae, Bathylagidae, and Moridae for the United Nations Educational Scientific and Cultural Organization (UNESCO) publication, "Check-List of the Fishes of the Tropical Eastern Atlantic." Three papers listed below were completed and submitted for publication. Deepsea fishes from a manganese nodule mining site in the Pacific were identified for the Lockheed Corp.

Publications

Cohen, D. M. Families Argentinidae, Bathylagidae, Opisthoproctidae, Bregmacerotidae, Moridae, and Melanonidae. In Fishes of the Northeast Atlantic and Mediterranean. UNESCO. (S)

Cohen, D. M. The deepsea fish genus Enchelybrotula (Ophidiidae): description of new species, notes on distribution, and osteology. Bull. Mar. Sci. (S)

Pérez Farfante, I. A new species of rock shrimp of the genus Sicyonia (Penaeoidea) with a key to the western Atlantic species. Proc. Biol. Soc. Washington. (S)

Yabe, M.; Cohen, D. M.; Wakabayashi, K.; Iwamoto, T. Fishes new to the eastern Bering Sea. Fish. Bull., US. (S)

ATLANTIC ENVIRONMENTAL GROUP

Ocean Monitoring and Climatology Task

The cooperative Ship of Opportunity Program (SOOP) obtained five XBT transects and one continuous plankton recorder (CPR) transect in March: two XBT and one CPR transect in the Gulf of Maine, two XBT transects across the shelf and slope off New York, and one XBT transect in the Gulf of Maine.

The following announcement of eddy conditions in the Georges Bank-Middle Atlantic Bight area was sent to the Commander of the Atlantic Area for the USCG for publication in the March issue of Atlantic Notice to Fishermen:

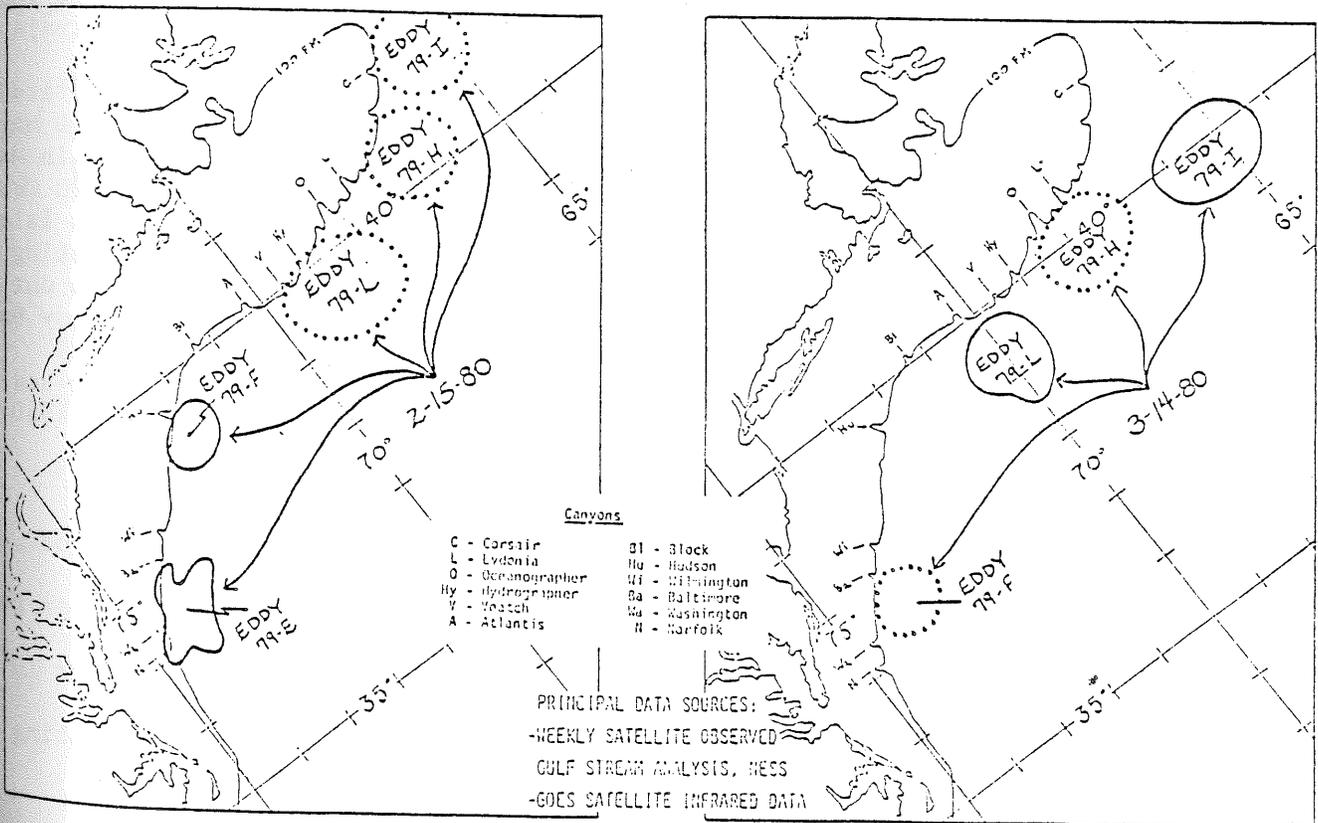
GULF STREAM EDDY LOCATIONS

The Atlantic Environmental Group of the National Marine Fisheries Service reports that there were four warm core Gulf Stream eddies present off the northeast coast of the United States in mid-March.

Eddy 79-E traveled 54 nm (100 km) southwest to 36.4°N, 74.3°W where it was resorbed by the Gulf Stream in early March. Eddy 79-F moved southwest about 133 nm (238 km) to a center position of 37.7°N, 73.7°W, east of Baltimore Canyon. Eddy 79-L advanced about 60 nm (111 km) westward, and is currently centered at 39.2°N, 70.0°W, south of Atlantis Canyon. Eddy 79-H moved west about 65 nm (120 km) to a position centered at 39.9°N, 67.8°W, south of Lydonia Canyon. Eddy 79-I traveled south for about 86 nm (160 km) and is centered at 39.9°N, 65.4°W, south of Corsair Canyon.

During the next 30 days eddy 79-F will continue to move southwest and will probably be resorbed by the Gulf Stream. Eddy 79-L may move west to Hudson Canyon, eddy 79-H west to Hydrographer Canyon; and eddy 79-I west to Lydonia Canyon.

Fishermen are requested to report unusual conditions or catches occurring in the vicinity of these eddies to the Director, Atlantic Environmental Group, National Marine Fisheries Service, RR 7, South Ferry Road, Narragansett, RI 02882, by mail. Updates on eddy positions and general information on Gulf Stream eddies may be obtained by calling the Atlantic Environmental Group (401-789-9326).



The British firm Almondbury Development Co., Ltd., has satisfactorily completed engineering and manufacturing drawings of the undulating oceanographic recorder (UOR). Fixed prices for the actual manufacture of one UOR with critical spare parts have been received from Almondbury and they have been instructed to proceed with building the unit, with delivery to AEG scheduled for the summer of 1980. A dual floppy-disk drive has been obtained and is being coupled with the microprocessor in the UOR translator to enable conversion of the UOR's cassette tapes to nine-track tapes. The translator will also be an aid in certain off-line processing of data for other AEG programs.

Ocean Dumping Studies Task

Two complete sets of deepsea amphipod traps, flotation equipment, release mechanisms, and other hardware are ready for shipment to the United Kingdom. These systems feature redundant release mechanisms, a locating pinger, and dual mode surface recovery beacons. Also included are spare parts kits for all the various components. The units will be shipped overseas in specially prepared and packaged containers and held for the June cruise to a deepwater radioactive waste dumpsite.

A pair of TIROS-N satellite-tracked buoys have been ordered from Ocean Research Equipment, Inc., of Falmouth, MA. These units will include a thermistor to give sea-surface temperature data and a drogue sensor. Unfortunately, the electronics package (produced by Handar in Santa Barbara, CA) is not an off-the-shelf item and will have its next production run in early May 1980. This will not allow completion and use of the buoys for the 6-10 May cruise to the 106-mi dumpsite.

Buoy and wind data from the three 1979 radio direction-finding (RDF) buoy experiments continue to be analyzed by the URI Data Projects Group and should be completed sometime in April. Programs are being developed to compute buoy location (great-circle triangulation), plot buoy positions, and define buoy trajectories (spline-fitting), and also to set up usable data files.

Buoy deployment plans and data collection arrangements are being finalized for the May 1980 RDF experiment discussed in the cruise instructions (6-10 May 1980, Kelez). Because of some poor past performances of the RDF systems in March, May, and November 1979, the three 4 and 6 MHz systems purchased by the NOS Ocean Dumping and Monitoring Division will be tested before the cruise in Block Island Sound in April. The URI R/V Schock will be used for the tests. Such testing and calibration should help ensure the success of this next experiment. Also during this cruise, members of the Ocean Pulse data collection team from the Sandy Hook Laboratory will travel to Rhode Island to take part. Also, Dr. Prithviraj Mukherji from the URI Graduate School of Oceanography will sharpen his at-sea amphipod trap locating skills using the actual beacon to be used in June 1980.

Meetings, Talks, Visitors, and Publicity

Mert Ingham conferred with the Ocean Pulse management team at Sandy Hook, NJ, during 5-7 March.

Woody Chamberlin went to Woods Hole, MA, to confer with Jim Zaitzeff on remote sensing, and to meet with NEFC personnel on squid ecology on 5 March.

On 6 March, Steve Cook attended a Center Awards Committee meeting held in Woods Hole.

On 12 March, Mert Ingham traveled to Stony Brook, NY, to attend a meeting of the Ocean Pulse/Northeast Monitoring Program working group.

Mert Ingham went to VIMS in Gloucester Point, VA, during 13-16 March to review the status and progress of fishery climatology research projects being conducted by VIMS staff members.

Jim Bisagni attended an EEO Seminar at Rockville, MD, on 18 March.

On 19 March, Woody Chamberlin attended a meeting on remote sensing which was held at the University of Massachusetts in Amherst, MA.

Mert Ingham attended a meeting on the development of a monitoring plan for the Georges Bank area which was held at the Woods Hole Laboratory on 18 March.

Publications

Celone, P. J.; Chamberlin, J. L. Anticyclonic (warm core) eddies off the northeastern United States during 1978. *Annal. Biol.* 35. (A)

Cook, S. K.; Hughes, M. M. Water column thermal structure across the shelf and slope southeast of Sandy Hook, NJ, USA in 1978. *Annal. Biol.* 35. (A)

Crist, R. W.; Chamberlin, J. L. Bottom temperatures on the continental shelf and slope south of New England during 1978. *Annal. Biol.* 35. (A)

Hilland, J. E.; Armstrong, R. S. Variation in the shelf water front position in 1978 from Georges Bank to Cape Romain. *Annal. Biol.* 35. (A)

Ingham, M. C.; McLain, D. R. Sea surface temperatures in the northwestern Atlantic in 1978. *Annal. Biol.* 35. (A)

Reports

Biasgni, J. J.; Kester, D. R. Physical variability at an East Coast United States offshore dumpsite. *Proc. 1st Inter. Ocean Dump. Symp.*; 1978. October.

Chamberlin, J. L. Commercial and recreational fisheries. In: Zaitzeff, J. B.; Cornillon, P.; Aubrey, D., eds. Remote sensing in the coastal and marine environment. *Proc. 1st US N. Atl. Reg. Workshop*; 1979 May 30-June 1; URI, W. Alton Jones Campus; 1980:18-23.

Ingham, M. C. Inventory of coastal sea level, water temperature and water density time series data available from AEG. *AEG Data Analysis Product No. 14*; 1980. (duplicated)

Jossi, J. W.; Marak, R. R. MARMAP survey manual. 43 p. Contribution to NOAA fisheries technology shipboard manual.